CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER R2-2002-0111
NPDES PERMIT NO. CA0037575

AMENDMENT OF WASTE DISCHARGE REQUIREMENTS, ORDER NO. 00-059, FOR:

NAPA SANITATION DISTRICT
NAPA, NAPA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board), finds that:

1. On July 19, 2000, the Board reissued Napa Sanitation District (hereinafter the Discharger) waste discharge requirements in NPDES permit, Order No. 00-059, which authorizes the Discharger to discharge secondary-treated effluent in the wet season from its Soscol Water Recycling Facility to the Napa River under specified conditions. This discharge was previously governed by waste discharge requirements in Order No. 94-037, adopted on March 16, 1994.

2. The Discharger, Bay Area Dischargers Association (now Bay Area Clean Water Agencies), and San Francisco BayKeeper (now WaterKeeper) all filed petitions for review of Order No. 00-059.

3. On September 6, 2001, the Solano Superior Court granted the Discharger a stay of its effluent limitations contained in Order No. 00-059 pending State Water Resources Control Board's (hereinafter the State Board) review of the petitions. The stayed limits include 85% removal of BOD_5 and TSS, effluent limitations in B(i)(7) and B(ii)(7) for priority pollutants, and mercury and dioxins/furans mass limits in B(iii).

4. On December 5, 2001, the State Board adopted Order WQ 2001-16 to remand Order No. 00-059 to the Board for issues raised in the petitions. By the same action, the State Board stayed the remanded portions of Order No. 00-059, including permit findings, effluent limitations, and provisions, until the Board acts to reconsider and modify, as appropriate.

5. This Order is to amend Board's Order No. 00-059 to comply with State Board's Order WQ 2001-16.

Discharge Description

6. The Discharger owns and operates a secondary municipal wastewater treatment facility located at the Soscol Water Recycling Facility south of the City of Napa, Napa County. The facility has a dry weather design capacity of 15.4 million gallons per day (mgd). It serves a current population of 70,000 people and provides secondary level treatment for domestic and light commercial wastewater collected from the City of Napa and adjacent unincorporated areas (see **Attachment A**: Site Location Map). Wastewater from the City of American Canyon (estimated to be 1.0 mgd) was disconnected from the Discharger's wastewater treatment system in September 2002.

7. When Order No. 00-059 was adopted in July 2000, the secondary treatment process included four oxidation ponds operating in series. In 1992, the Discharger began designing and constructing a conventional activated sludge system with an anaerobic sludge digester in addition to the oxidation

pond system. This project also included new screens, aerated grit chambers, and primary clarifiers. In September 2001, the new systems were completed and put on-line. During the wet season (from November 1 through April 30), raw wastewater is treated using screens, aerated grit chambers, and primary clarifiers. After primary clarification the flow is treated in the activated sludge system and/or the oxidation pond system. Up to 8 mgd of wastewater can be treated by the new activated sludge system followed by secondary clarification. The oxidation pond system consists of four oxidation ponds followed by polymer coagulation and clarification. The Discharger is currently conducting a study to optimize treatment and effluent quality and minimize operating costs at the facility. Treatment scenarios being evaluated include full secondary treatment in the oxidation ponds, a combination of secondary treatment with some percentage of flow treated in the activated sludge process and the rest in the oxidation pond process, and full secondary treatment in the activated sludge process with peak wet season flows treated in the oxidation ponds. After secondary treatment, the oxidation pond system effluent is blended with the activated sludge effluent before undergoing chlorination, and dechlorination, prior to discharge to the Napa River (see **Attachment B**: Treatment Process Flow Diagram). The wet weather average flow was approximately 14.0 mgd during the 1999-2002 wet seasons.

8. During the dry season (from May 1 through October 31), raw wastewater will be treated in the same way as in the wet season. Secondary treatment scenarios being evaluated for the dry season are the same as for the wet season. After secondary treatment, the oxidation pond system effluent is blended with the activated sludge effluent, followed by coagulation, filtration and chlorination before reclamation. The flow not used for reclamation remains in the oxidation ponds and does not undergo polymer coagulation and clarification until the wet season begins when the discharge of the effluent into Napa River is allowed. The dry weather discharge to Napa River is generally prohibited, but with appropriate notification and justification to the Executive Officer of the Board an emergency discharge to Napa River may occur during this period.

Basis of Order

9. *State Board Remand Order*. State Board Order WQ 2001-16 remands Order No. 00-059 to the Board to address the issues described in Finding 11, Purpose of Order.

10. *Modifications of treatment plant*. When Order No. 00-059 was adopted, the Discharger was in the process of constructing the new activated sludge (AS) treatment system. In September 2001, the new AS system was put on-line, treating up to 8 mgd wastewater. AS systems are more reliable and effective for the quantities of flow being treated at the Discharger's facility. However, AS systems are generally not as effective at removing metals as oxidation ponds, the effluent characteristics have changed as a result of the system change. In light of this fact, it is necessary to perform a reasonable potential analysis (RPA) based on the effluent data collected from the new treatment processes, which include AS treatment system as well as the oxidation ponds.

Purpose of Order

11. This Order amends NPDES Permit No. CA 0037575, Order No. 00-059 on the following issues:
    a. Perform reasonable potential analysis (RPA) using effluent data from new treatment process to determine which constituents need effluent limitations, and add relevant findings;
    b. Clarify Findings 44, 45 and 46 of Order No. 00-059, covering copper, mercury, and dioxins/furans;

c. Clarify the basis on which the Board found reasonable potential for mercury, and basis for dioxins/furans monitoring requirements;

d. Clarify the permit findings and augment the record to support the mercury mass limits, and remove dioxins/furans mass limits;

e. With adequate demonstration of infeasibility to comply with water quality-based effluent limits and compliance with antibacksliding and antidegradation policies, reassess interim concentration limits for copper, mercury and cyanide, based on the pooled effluent data from other Bay Area dischargers with similar treatment systems;

f. Remove the effluent limitations for pollutants not detected in the effluent, which are listed in B(i)(7) and B(ii)(7);

g. Address the need for the dioxins/furans study and the evidence supporting these requirements in Provision F.12 and Self-Monitoring Program (Part B), and waive the year-round sampling requirement.

CEQA and Public Notice of Action

12. This Order serves as an amendment to NPDES Permit No. CA0037575, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code.

13. The Discharger and interested agencies and persons have been notified of the Board's intent to amend the waste discharge requirements for the existing discharge and have been provided an opportunity to submit their written views and recommendations. The Board's responses to comments are hereby incorporated by reference.

14. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the Discharger shall comply with Order No. 00-059 as amended. To distinguish the original language contained in Order No. 00-059 from this Order, all the amendments are highlighted by underline for additions and ~~strikethrough~~ for deletions, except for those specified as "Replace" or "Remove".

1. Replace Finding 27 with the following findings:

27. *Applicable Water Quality Objectives.* The water quality objectives (WQOs) applicable to the receiving water of this discharge are from the Basin Plan, the CTR, or the NTR.

a. The Basin Plan specifies numeric WQOs for 10 priority toxic pollutants, as well as narrative WQOs for toxicity and bioaccumulation in order to protect beneficial uses. The pollutants for which the Basin Plan specifies numeric objectives are arsenic, cadmium, chromium (VI), copper in freshwater, lead, mercury, nickel, silver, zinc, and cyanide. The narrative toxicity objective states in part "[a]ll waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms"(BP, page 3-4). The bioaccumulation objective states in part "[c]ontrollable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered" (BP, page 3-2). Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on available information.

b. The CTR specifies numeric aquatic life criteria for 23 priority toxic pollutants and numeric human health criteria for 57 priority toxic pollutants. These criteria apply to inland surface waters and enclosed bays and estuaries such as here, except that where the Basin Plan's Tables 3-3 and 3-4 specify numeric objectives for certain of these priority toxic pollutants, the Basin Plan's numeric objectives apply over the CTR (except in the South Bay south of the Dumbarton Bridge).

c. The NTR established numeric aquatic life criteria for selenium, numeric aquatic life and human health criteria for cyanide, and numeric human health for 34 toxic organic pollutants for waters of San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. This includes the receiving water for this discharge.

2. Replace Finding 28 to read as follows:

28. *Receiving Water Salinity.*

a. CTR salinity criteria will be used to determine if CTR's fresh, marine water quality criteria, or lower of the two should apply to a discharge. Basin Plan salinity criteria will be used to determine if Basin Plan's fresh, marine water quality objectives, or lower of the two should apply to a discharge.

b. The CTR states that the salinity characteristics (i.e., freshwater vs. marine water) of the receiving water shall be considered in establishing WQOs. The SIP states that "the CTR specifies the salinities to which the freshwater and saltwater criteria apply" (SIP, page 2). Freshwater effluent limitations shall apply to discharges to waters with salinities lower than 1 part per thousand (ppt) at least 95 percent of the time. Marine (saltwater) effluent limitations shall apply to discharges to waters with salinities greater than 10 ppt at least 95 percent of the time in a normal water year. For discharges to waters with salinities in between these two categories, or to tidally-influenced freshwaters that support estuarine beneficial uses, effluent limitations shall be the lower of the marine or freshwater effluent limitation, based on ambient hardness, for each substance. The receiving waters for the subject discharges are tidally influenced saltwaters, with significant freshwater inflows during the wet weather season. The Discharger conducted a study on the salinity of Napa River at the Discharger's outfall (sampling point CC-3) and the results show that 73% of the time the salinity is less than 1 ppt and 9% of the time the salinity is greater than 10 ppt which does not meet the CTR freshwater or marine water criteria, respectively, therefore estuarine water criteria applies to the discharge. RMP data, from 1996 through 1998, supports the estuarine water salinity results from sampling point CC3 – 33% of the time, the salinity is less than 1 ppt, and 11% of the time, the salinity is greater than 10 ppt. Therefore, this Order's effluent limitations are based on the lower of the CTR's fresh and marine water criteria.

c. The Basin Plan states that the salinity characteristics of the receiving water shall be considered in determining the applicable Basin Plan's water quality objectives. The Basin Plan defines freshwaters as "waters both outside the zone of tidal influence and with salinities lower than 5 ppt at least 75% of the time in a normal water year." Marine waters or saltwaters are "waters with salinities greater than 5 ppt at least 75% of the time in a normal water year. . . ." Effluent limitations for waters with salinities in between or for "tidally influenced freshwaters that support estuarine beneficial uses" are the lower of the marine or freshwater effluent limitations, based on ambient hardness, for each substance (BP, page 4-13). The Basin Plan defines the lower portions of the Napa River as estuarine (BP, page 2-5), which states in part, "...Estuarine waters are comprised of the Bay system from Golden Gate to the regional boundary near Pittsburg and the lower portions of streams flowing into the Bay, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south." The Discharger discharges to the Napa River at a location that is within the upper reaches of wetlands identified as brackish in the Basin Plan (BP, Figures 2-8 and 2-11, and Table 2-10). Furthermore, according to a map attached to Order No. 00-059, a tidal gate is located upstream of the Discharger's outfall (WQ 2001-16, page 45). Therefore, the Discharger's receiving water is classified as estuarine under Basin Plan criteria.

3. Revise Finding 34 to read as follows:

34. *Interim Limits for 303(d) Listed Pollutants.* In the interim, until either final WQBELs or WLAs are adopted for 303(d)-listed constituents, or a listed constituent is delisted, state and federal antibacksliding and antidegradation policies and the SIP requires that the Board include interim effluent concentration limits that are either based on current performance or from the previous Order's concentration limit – whichever is more stringent - to ensure that the waterbody will not be further degraded. The Board has established interim performance-based mass limits for 303(d)-listed bioaccumulative constituents with a reasonable potential. ~~These interim mass limits are based on recent discharge data and are determined for constituents that have a reasonable potential and are bioaccumulative.~~

4. Replace Finding 35 with the following.

35. *Dilution and Assimilative Capacity.* In response to the State Board's Order No. WQ 2001-06, staff has evaluated the assimilative capacity of the receiving water for 303(d) listed pollutants for which the Discharger has reasonable potential in its discharge. The evaluation included a review of RMP data (Mouth of Napa River, Yerba Buena Island and Richardson Bay stations), fish contamination data, effluent data, and WQOs. From this evaluation, staff has found that the assimilative capacity is highly variable due to the complex hydrology of the receiving water. Therefore, there is uncertainty associated with the representative nature of the appropriate ambient background data to conclusively quantify the assimilative capacity of the receiving water. Pursuant to Section 1.4.2.1 of the SIP, "dilution credit may be limited or denied on a pollutant-by-pollutant basis..."

a. For bioaccumulative and impairing pollutants, based on BPJ, dilution credit is not included in calculating the final WQBELs. This determination is based on available data on concentrations of these pollutants in aquatic organisms, sediment, and the water column. At the present time, dilution credit is not included for several pollutants including mercury, dioxins and furans. Primarily, this determination is based on a San Francisco Bay fish tissue data that show these pollutants exceed screening levels. The fish tissue data are contained in "*Contaminant Concentrations in Fish from San Francisco Bay 1997*", May 1997. Denial of dilution credits in the calculation of WQBELs for bioaccumulative pollutants that are 303(d) listed is further justified by fish advisories to the San Francisco Bay. The office of Environmental Health and Hazard Assessment (OEHHA) performed a preliminary review of the data from the 1994 San Francisco Bay pilot study, *"Contaminated Levels in Fish Tissue from San Francisco Bay"*. The results of the study showed elevated levels of chemical contaminants in the fish tissues. Based on these results, OEHHA issued an interim consumption advisory covering certain fish species from the bay. The health advisory was first posted in December 1994. This interim consumption advice was issued and is still in effect due to health concerns based on exposure to sport fish from the bay contaminated with mercury, polychlorinated biphenyls (PCBs), dioxins, and pesticides (e.g., DDT). Based on these data, the Board placed selenium, mercury, and PCBs on the CWA Section 303(d) list. The U.S.EPA added dioxins and furans compounds, dieldrin, Chlordane, and 4,4'-DDT on the CWA Section 303(d) list. Therefore, the Board must deny dilution credit unless there is pollutant-specific scientific evidence that clearly demonstrates the existence of assimilative capacity and no potential bioaccumulative problems.

b. Furthermore, Section 2.1.1 of the SIP states that for bioaccumulative compounds on the 303(d) list, the Board should consider whether mass-loading limits should be limited to current levels. The Board finds that mass loading limits are warranted for certain bioaccumulative compounds on the 303(d) list for the receiving waters of this discharge. This is to ensure that this discharge does not contribute further to impairment of the narrative objective for bioaccumulation.

c. For non-bioaccumulative constituents, however, the dilution credit is not relevant in this Order since no site-specific ambient background data is available. This data gap is addressed by issuance of a technical information request (13267) letter dated August 6, 2001 by Board staff, entitled, *"Requirement for Monitoring of Pollutants in Effluent and Receiving Water to Implement New Statewide Regulations and Policy".* The Discharger is working collaboratively with four other dischargers discharging into the Napa River and has developed a receiving water sampling plan. The sampling plan has been conditionally approved by a letter dated December 20, 2001. The Discharger shall submit an interim report by May 18, 2003, and a final report by January 19, 2004. The Discharger will develop a site-specific hardness value for adjusting the WQOs for RPA and WQBEL calculations.

5. Remove Finding 42.b.

6. Remove Finding 42.c, first paragraph.

c. ~~*RPA Data.* The RPA was based on effluent monitoring data for January 1997 through December 1999. More information must be gathered on the upstream, ambient receiving waters in order to complete a RPA. Table 5 summarizes the RPA and lists the constituents, and where available, the lowest, adjusted WQO, the MEC, and the "Reasonable Potential" result. Table 5 summarizes the previous, performance-based and interim limits and lists the constituents, the limits from the previous permit, the range of the constituent concentrations detected in the effluent, the interim limits, the minimum levels and laboratory technique that can meet the specified minimum level, for the wet and dry seasons.~~

7. Add the following finding as Finding 42.d - Reasonable Potential Analysis (RPA):

(1) *Data selection.* There are eight months of effluent data available after the new treatment system was operational. The reasonable potential for CTR priority pollutants is re-evaluated based on the limited monitoring data of the effluent from the new treatment processes from September 2001 through April 2002.

(2) *Justification of using the new data.* Board staff performed an examination of all the available priority heavy metal data, including arsenic, chromium, copper, lead, mercury, nickel, silver,

zinc, and cyanide and selenium data for the specified time period. Time series plots of arsenic, copper, mercury, zinc, nickel and cyanide can be found in **Attachment C:** Time Series Plot for Selected Heavy Metals and Cyanide. For all the constituents examined, the effluent data variability is within reasonable range, which implies that the new treatment processes did not experience a shakedown or start-up problem within the first 90 days of the operation of the new treatment system. This is in part due to the Discharger still using the pond systems to treat the influent greater than 8 mgd.

(3) *Data collection requirement.* There are limited effluent monitoring data available for the new treatment system, there are only eight months of data for a limited number of priority pollutants (e.g. heavy metals, cyanide, selenium). The Discharger submitted one set of monitoring results performed in September 2001 for most of the priority organic pollutants. No monitoring data for the 17 dioxins/furans congener is available for the new treatment system's effluent. These data gaps are addressed by the August 6, 2001 letter and revised Provision F.12. The Discharger is required to perform effluent characterization sampling for the 126 CTR priority pollutants plus tributyltin, chlorpyrifos, diazinon, and 17 dioxins/furans congeners, with a frequency of twice per year during the wet season for three consecutive years. For the Board's approved dry weather emergency discharges, the Discharger should perform the same sampling at least once for each dry season. When enough data is available, the Board may reopen the permit, revisit the RPA, and calculate new effluent limits based on the Discharger's data.

(4) *Summary of RPA*: Based on the limited data, there are three priority pollutants that have reasonable potential to cause or contribute to an excursion of the water quality objectives, which are: copper, mercury, and cyanide. With only one data point for most of the CTR priority organic pollutants, the RPA for CTR priority organic pollutants will be deferred until more data is available. Table 1 depicts the RPA results.

Table 1. Reasonable Potential Analysis (RPA) Results

Constituent [1]	Freshwater WQO chronic/acute (µg/L)	Saltwater WQO chronic/acute (µg/L)	Applicable WQO (µg/L)	Lowest WQO Basis [2]	MEC (µg/L)	Maximum Ambient Background Conc. (µg/L) [5]	Reasonable Potential
Arsenic	190 / 360	36 / 69	36	BP, sw	2	NA	No
Cadmium	1.1 / 3.9	9.3 / 43	1.1	BP, fw, H-100	All non-detect	NA	No
Chromium	11 / 16	50 / 1100	11	BP, fw	0.7	NA	No
Copper*	11.82 / 17.73	7.38 / 8.42	7.38	CTR, sw, T=0.42/0.57[4]	13	NA	**Yes**
Lead	3.2 / 81	5.6 / 140	3.2	BP, fw	0.4	NA	No
Mercury*	0.025 / 2.4	0.025 / 2.1	0.025	BP, sw	0.15	NA	**Yes**
Nickel*	56 / 1100	7.1 / 140	7.1	BP, sw	4.9	NA	No
Selenium*	5 / 20		5.0	NTR, fw	5	NA	No
Silver	4.06 (inst. max)		4.06	BP, fw, H-100	0.3	NA	No
Zinc	58 / 170	58 / 170	58	BP, sw	30	NA	No
Cyanide	5.2 / 22	1 / 1	1.0	CTR, sw	20	NA	**Yes**
All other CTR #s 17-126			Various or NA	CTR, hh	Not enough information	NA	No [3]

Footnote:

1. * = Constituents on 303(d) list.
2. RPA is based on the following: H=Hardness is assumed to be 100 in mg/L as $CaCO_3$, objectives can be readjusted based on a site-specific hardness value; BP = Basin Plan; CTR = California Toxics Rule; NTR=National Toxics Rule; fw = freshwater; sw = saltwater; hh = human health; T = translator to convert dissolved CTR WQOs to total recoverable metal.
3. "No" due to lack of background data, lack of objectives/criteria, or lack of effluent data.
4. Translator for copper is 0.42 for converting dissolved CTR chronic WQO to total WQO, and 0.57 for converting acute criterion (for wet weather discharges). Translators are from Discharger's *"Copper Translator Study Progress Report"* dated June 28, 2002.
5. Site-specific ambient background data is not available (NA). The Discharger is working collaboratively with four other dischargers discharging into the Napa River and has developed a receiving water sampling plan to sample two stations in Napa River. An interim report is due on May 18, 2003.

8. Add new findings as Finding 43.1

43.1. Interim Limit and Compliance Schedule

a. On August 23, 2002 and September 26, 2002, the Discharger submitted a feasibility study and a supplemental (see **Attachment G**: Napa Sanitation District Feasibility Study for NPDES Permit Amendment and Supplemental Information). The Discharger has demonstrated according to the Basin Plan (page 4-14, Compliance Schedule) and SIP (Section 2.1, Compliance Schedule), that it is infeasible to immediately comply with the WQBELs for copper, mercury and cyanide as calculated using Section 1.4 of the SIP. The feasibility study and supplemental propose specific tasks for future source identification, source reduction and public outreach, how to evaluate the effectiveness of these tasks, and a time schedule for implementing each task.

b. For copper and cyanide, due to the lack of ambient background data, the WQBELs for wet weather discharges, for which a dilution credit is granted, cannot be calculated. Therefore, interim limits are necessary while the Discharger is performing receiving water sampling to fill this data gap.

c. This permit amendment establishes a compliance schedule of July 31, 2005 for final limits based on CTR criteria (i.e., copper, cyanide), and a compliance schedule of March 31, 2010 for the final limits based on the Basin Plan numeric objective for mercury.

d. At this time, there are not enough effluent data from the Discharger's new treatment systems, therefore, interim concentration limits were derived in this Order for copper, mercury, and cyanide based on the performance of other Bay Area POTWs with similar treatment processes at the 99.87th percentile (or three standard deviations above the mean) of the pooled effluent data for each constituent.

e. The Discharger participates in a regional discharger-funded effort to conduct a study for development of site-specific objective for cyanide. The cyanide study plan was submitted on October 29, 2001. The Discharger is required to participate in the study, which will include submission of a final report to the Board by June 30, 2003. The Board intends to include, in a subsequent permit revision, a final limit based on the study results.

f. The Basin Plan provides for a 10-year compliance schedule for implementation of measures to comply with new standards as of the effective date of those standards. This provision has been construed to authorize compliance schedules for new interpretations of existing standards, such as the numeric water quality objectives specified in the Basin Plan, resulting in more stringent limits than in the previous permit. Due to the adoption of the SIP, the Board has newly interpreted these objectives. As a result of applying the SIP methodologies, the effluent limitations for some pollutants are more stringent than the prior permit. Accordingly, a compliance schedule is appropriate here for the new limits for these pollutants.

9. Add the following findings as Finding 43.2.

43.2. Antidegradation Analysis

a. In accordance with the SIP, numeric, interim limitations are based on current treatment plant performance or existing permit limitations, whichever is more stringent. These interim limits will be superseded upon completion of TMDL and WLA, if applicable. According to the antibacksliding rule of the Clean Water Act, Section 402(o), the permit may be modified to include a less stringent requirement following completion of a TMDL and WLA, or if one of the other bases for an exception to the rule is met. Pursuant to statutory antibacksliding provisions of 33 U.S.C. §1342(o)(2)(A) and (B) and §1313(d)(4) or Federal regulations 40 CFR 122.44(l)(A) and (B)(1), another exception from the backsliding prohibition is if material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation; or information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit reissuance. Due to the facility changes from the oxidation pond system to the activate sludge system in 2001, interim limits should be reevaluated if it can be demonstrated that less stringent interim limits are consistent with antibacksliding and antidegradation policies.

b. On August 23, 2002 and September 26, 2002, the Discharger submitted an antidegradation analysis and a supplemental (see **Attachment H**: Antidegradation Analysis for the Napa Sanitation District Water Recycling Facility and Supplemental Information) to analyze the water quality impacts that the proposed discharge will have on the receiving waters: the Napa River and San Pablo Bay. The key finding to be established is whether the new discharge will produce significant changes in the water quality of these receiving waters that would adversely impact beneficial uses. Specifically, the Antidegradation Analysis is based on an examination of the following:

(1) Existing applicable water quality standards for the receiving waters;
(2) Ambient conditions in the receiving waters in comparison to applicable water quality standards;
(3) Incremental changes in constituent loadings resulting from the proposed change in discharge;
(4) Comparison of the proposed increase in loadings relative to other sources; and
(5) An assessment of the significance of changes in receiving water quality.

This Study shows that there is no significant impact to the receiving water quality by the proposed discharges.

10. Replace Finding 44 on copper with the following findings:

44. Copper

a. *CTR Copper Water Quality Objectives and WQBELs.* The Basin Plan freshwater copper criteria are 11.8 μg/L for chronic protection and 17.7 μg/L for acute protection, based on a hardness value of 100 mg/L as $CaCO_3$. The saltwater criteria for copper in the adopted CTR are 3.1 μg/L for chronic protection and 4.8 μg/L for acute protection. The Discharger has developed interim site-specific translators after one year of sampling of its receiving water, which gives the values of 0.42 and 0.57 for wet season discharges, 0.85 and 0.95 for dry season discharges, as the translators to convert dissolved CTR chronic WQO and acute WQO to the corresponding total recoverable WQOs, respectively. Using the site-specific translators, translated criteria are 7.4 μg/L for chronic protection and 8.4 μg/L for acute protection for wet season discharges, and 3.65 μg/L and 5.05 μg/L as chronic and acute criteria for dry weather discharges. Therefore, the CTR saltwater WQOs are more stringent, and are the applicable WQOs for RPA and WQBELs calculation.

b. *Copper WQBELs.* Using the CTR criteria, the WQBELs for dry weather discharges are calculated to be 2.5 μg/L and 5.1 μg/L as AMEL and MDEL, respectively. For wet weather discharges, since the site-specific background data are not available, the WQBELs with dilution credit cannot be calculated. The final WQBELs for copper will be based on the more stringent of the SSOs (applicable to saltwater only) and freshwater criteria, or WLA contained in a TMDL if one is completed.

c. *Copper Interim Effluent Limits.* Due to the lack of ambient background data for copper, the WQBELs for wet weather discharges, for which a dilution credit is granted, cannot be calculated. Furthermore, the Discharger has demonstrated that it is infeasible to immediately comply with the WQBELs established for dry weather discharges, for which no dilution credit is granted. Since there are too few data points from the Discharger's effluent to calculate a performance-based effluent limit, an interim limit based on the performance of 10 Bay Area dischargers with activated sludge treatment processes is developed. The 99.87th percentile of the pooled copper effluent data is calculated to be 34 μg/L, and is established as monthly average. This analysis can be found in **Attachment D (1)**: Copper Pooled Data Analysis.

d. *Copper Antidegradation*. The Discharger is cooperating with other dischargers to conduct impairment assessment studies aimed at collecting additional copper data in San Pablo Bay. The Board has considered these studies in its 303(d) listing decision in 2001, and will consider them when assessing any SSOs proposed for copper, which will include the Napa Sanitation District. Future copper WQBELs would be developed consistent with SIP procedures in Section 5.2 if the impairment studies support adoption of an SSO. On November 28, 2001, the Board considered a staff report on *Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Region* and authorized the Executive Officer to transmit proposed revisions to the State Board. Copper is proposed to be de-listed from all segments of the San Francisco Estuary north of the Dumbarton Bridge including San Pablo Bay and Napa River, but excluding the tidal portion of the mouth of Petaluma River. In the Antidegradation Analysis dated August 23, 2002, the Discharger has demonstrated that the increase of the mass loadings of copper due to the change of the treatment processes has no measurable impacts on the receiving water.

e. *Water Effects Ratios.* The CTR provides for adjusting the criteria by deriving site-specific objectives through application of the water-effect ratio (WER) procedure. The U.S.EPA includes WERs to assure that the metal criteria are appropriate for the chemical conditions under which they are applied. A WER accounts for differences between a metal's toxicity in laboratory dilution water and its toxicity in water at the site. The U.S.EPA's February 22, 1994 *Interim Guidance on Determination and Use of Water Effects Rations for Metals* superseded all prior U.S.EPA guidance on this subject. The WERs shall be developed in accordance with procedures contained in Section 5.2 of the SIP.

f. *Copper Translator Study.* The Discharger has elected to perform a site-specific copper translator study. The study includes 7 sampling stations located from approximately 1600 feet upstream of the Discharger's outfall to 3 miles downstream of the outfall. From September 2001 to April 2002, the Discharger performed a total of 10 sampling events. The ratios of the dissolved and total recoverable copper are used to develop the translator. Only the data from the 4 most downstream stations were used to derive the translators since it is believed that the upstream stations are still within the mixing zone. The data analysis show that (1) there is significant difference between the dissolved/total copper ratios calculated using dry weather and wet weather data; (2) there is difference in the ratios between the high tide and low tide sampling events, but not significantly different; (3) the data from the 4 stations are pooled into two groups - dry and wet weather, the median of the ratios is used as the translator for chronic objective, and the 90th percentile of the data is used as the translator for acute objective; (4) The interim seasonable translator values are estimated to be:

Table 2. Interim Copper Translators

Season	For Acute WQOs	For Chronic WQOs
Dry	0.95	0.85
Wet	0.57	0.42

The Discharger has proposed a two-year sampling in the study plan dated July 11, 2001. In the progress report dated June 28, 2002, the Discharger requested to waive the second year sampling or to sample at only one sampling station during the second year.

g. *Treatment Plant Performance and Compliance Attainability with Interim Limit.* Effluent copper concentrations during the past 9 months (September 2001-April 2002) range from 1.5 μg/L to 13 μg/L (15 samples). No effluent concentrations exceed the interim effluent limit.

11. Replace Finding 45 regarding mercury with the following findings:

45. <u>Mercury</u>

a. *Mercury Water Quality Objectives.* The Basin Plan specifies objectives for the protection of aquatic life of 0.025 μg/L as 4-day average and 2.1 μg/L as 1-hour average. The CTR specifies a long-term average criterion for protection of human health of 0.051 μg/L.

b. *Mercury WQBELs.* No dilution credit is allowed for mercury. Using Basin Plan criteria, the WQBELs are calculated to be 0.021 μg/L and 0.040 μg/L as AMEL and MDEL, respectively, for both dry weather and wet weather discharges.

c. *Mercury TMDL.* The current 303(d) list includes the San Pablo Bay as impaired by mercury, due to high mercury concentrations in the tissue of fish from the Bay. Methyl-mercury, the highly toxic form of mercury, is a persistent bioaccumulative pollutant. There is no evidence to show that the mercury discharged by the District is taken out of the hydrologic system, by processes such as evaporation before reaching San Pablo Bay. Absence this evidence, the Board assumes that the mercury reaches the Bay through either sediment transport or water flows. Therefore, the District's mercury mass loading discharged to the Napa River can exacerbate the identified impairment of San Pablo Bay. The Board intends to establish a TMDL that will lead towards overall reduction of mercury mass loadings into the San Pablo Bay. The final mercury effluent limitations will be based on the Discharger's WLA in the TMDL, and the permit will be revised to include the final water quality-based effluent limit as an enforceable limitation.

d. *Mercury Control Strategy.* Board staff is developing a TMDL to control mercury levels in the San Pablo Bay. The Board, together with other stakeholders, will cooperatively develop source control strategies as part of the TMDL development. Municipal discharge point sources may not be the most significant mercury loadings to San Pablo Bay. Therefore, the currently preferred strategy is to apply interim mass loading limits to point source discharges while focusing mass reduction efforts on other more significant and controllable sources. While the TMDL is being developed, the Discharger will cooperate in maintaining ambient receiving water conditions by complying with performance-based mercury mass emission limits. Therefore, this Order includes interim mass loading effluent limitations for mercury, as described in the findings below. The Discharger is required to implement source control measures and cooperatively participate in special studies as described below.

e. *Mercury Interim Effluent Limits.* The Discharger has demonstrated that it is infeasible to immediately comply with the WQBELs. Therefore, this Order establishes an interim monthly average limit for mercury based on Board staff's analysis of the performance of over 20 secondary treatment plants in the Bay Area. This analysis is described in a Board staff report titled "Staff Report, Statistical Analysis of Pooled Data from Region-wide Ultra-clean Mercury Sampling". The objective of the analysis is to provide an interim concentration limit that characterizes regional facility performance using only ultra-clean data and compliance of which will ensure no further degradation of the receiving water quality resulting from the discharge. The conclusions of the report demonstrate that the statistical performance-based mercury limit for a secondary plant is 0.087 μg/L. The Discharger operates a secondary-level treatment plant (activated sludge plus oxidation pond system), therefore the interim concentration-based limit is 0.087 μg/L for both dry and wet weather discharge. The interim limit will remain in effect until March 31, 2010, or until the Board amends the limit based on a WLA.

f. Based on Board staff's report titled "Watershed Management of Mercury in the San Francisco Bay Estuary: Total Maximum Daily Load Report to U.S.EPA," dated June 30, 2000, municipal sources are a very small contributor of the mercury load to the Bay. Because of this, it is unlikely that the TMDL will require reduction efforts beyond the source controls required by this permit.

g. *Mercury antidegradation.* The performance-based mercury mass limits are consistent with Anti-degradation policy. This interpretation finds support in the language of the federal policy. The policy establishes three tiers of water quality protection. In Tier one, the states must, at a minimum, ensure that the water quality necessary to support existing instream uses is maintained. Tier two waters are referred to as "high quality waters." These are waters whose quality is better than that required to support instream uses. Water quality may be lowered in these waters if necessary to allow important economic or social development. Tier three waters are outstanding national resource waters, such as Lake Tahoe and Mono Lake. No lowering of water quality is allowed in Tier three waters.

Tier one waters are obviously waters whose quality does not meet that of Tier two waters. Tier one waters, thus, are waters whose quality is not better than that required to support instream uses. They are necessarily waters that are either not attaining or are just barely attaining standards. San Pablo Bay has been identified on the 303(d) list as a non-attainment water due to mercury bioaccumulation in fish tissues. Bay waters are, therefore, presumably in Tier one with respect to mercury.

In the Antidegradation Analysis submitted by the Discharger on August 23, 2002, the Discharger has demonstrated that the increase of mass loading for mercury has no measurable impacts on the receiving water. Although this Order includes an increased concentration limit for mercury, the mass limit is unchanged from Order No. 00-059. By maintaining the same mass limit, the water body is protected from further degradation by the discharge.

h. *Treatment Plant Performance and Compliance Attainability with the Interim Limit.* Effluent concentrations from September 2001 through April 2002 range from 0.0018 to 0.15 µg/L (23 samples). There is one extreme effluent value (0.15 µg/L) which is 30 times higher than the average effluent concentration for the study period. Board staff examined the data and found that the influent mercury concentration for the same month was also much higher than that of the other months. Therefore, it is concluded that this extremely high effluent concentration was caused by a rare event (treatment plant disturbance), and is not typical of the treatment plant's performance. The interim limit is attainable under normal treatment conditions.

12. Replace Finding 46 on Dioxin and Furans with the following findings:

46. Dioxins and furans.

a. Dioxin is one of the most toxic and environmentally stable tricyclic aromatic compounds of its structural class, it may be formed during the water and wastewater chlorination process, or occur as contaminants in the manufacture of certain organic chemicals. Due to its very low water solubility, most of the 2,3,7,8-TCDD occurring in water is expected to be associated with sediments or suspended material, or may build up in the food chain and bioaccumulate in animals. Aquatic sediments may be an important, and ultimate, environmental sink for all global releases of TCDD. Two processes which may be able to remove TCDD from water are photolysis and volatilization. However, many bottom sediments may not be susceptible to significant photodegradation, and the volatilization model predicts an overall volatilization removal half-life of over 50 years. Various biological screening studies have demonstrated that TCDD is generally resistant to biodegradation. The persistence half-life of TCDD in lakes has been estimated to be in excess of 1.5 years.

b. The Department of Health and Human Services (DHHS) has determined that TCDD may reasonably cause cancer. The CTR establishes a numeric human health WQC of 0.014 picograms per liter (pg/L) for 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD) based on consumption of aquatic organisms.

c. The preamble of the CTR states that California NPDES permits should use toxicity equivalents (TEQs) where dioxin-like compounds have reasonable potential with respect to narrative criteria. The preamble further states that U.S.EPA intends to use the 1998 World Health Organization Toxicity Equivalence Factor (TEF)[1] scheme in the future and encourages California to use this scheme in State programs. Additionally, the CTR preamble states U.S.EPA's intent to adopt revised water quality criteria guidance subsequent to their health reassessment for dioxin-like compounds.

d. *Monitoring requirement.* The SIP applies to all toxic pollutants, including dioxins and furans. The SIP requires a limit for 2,3,7,8-TCDD if a limit is necessary, and requires monitoring for a minimum of 3 years by all major NPDES dischargers for the other sixteen dioxin and furan compounds. Compliance with this requirement shall be achieved in accordance with the specifications stated in the Board's August 6, 2001 Letter under Effluent Monitoring for Major Dischargers.

e. The Basin Plan contains a narrative WQO for bio-accumulative substances: "Many pollutants can accumulate on particulates, in sediments, or bio-accumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered" (BP, page 3-2). This narrative WQO applies to dioxin and furan compounds, based in part on the scientific community's consensus that these compounds associate with particulates, accumulate in sediments, and bioaccumulate in the fatty tissue of fish and other organisms.

f. The U.S.EPA's 303(d) listing determined that the narrative objective for bio-accumulative pollutants was not met because of the levels of dioxins and furans in the fish tissue.

g. *Monitoring Requirement.* The Discharger has not submitted any dioxins/furans monitoring data since June 2000. This data gap is addressed by the August 6, 2001 letter and revised Provision F.12. The Discharger will start the 3-year sampling of the 17 congeners and fulfill the requirements by the time to apply for reissuance of the permit.

13. Add new findings on Cyanide as Finding 46.1 to read as follows:

46.1 Cyanide

a. *Cyanide Water Quality Objectives.* Both the Basin Plan and CTR include objectives that govern cyanide for the protection of aquatic life in the surface water. The Basin Plan specifies freshwater objectives of 5.2 μg/L as a 4-day average and 22 μg/L as a 1-hour average. The CTR specifies the saltwater Criterion Maximum Concentration (CMC) and Criterion Chronic Concentration (CCC) as 1 μg/L. Both CCC and CMC values are below the presently achievable reporting limits (range from approximately 3 to 5 μg/L).

b. Cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix inferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. This question is being explored in a national research study sponsored by the Water Environment Research Foundation (WERF).

[1] The 1998 WHO scheme includes TEFs for dioxin-like PCBs. Since dioxin-like PCBs are already included within "Total PCBs", for which the CTR has established a specific standard, dioxin-like PCBs are not included in this Order's version of the TEF scheme.

c. Concern has been raised by the discharger about the occurrence of artifactual (false positive) cyanide as evidenced by effluent concentrations greater than influent concentrations. The Discharger supports efforts to develop a site-specific objective for cyanide in the Bay, given that cyanide does not persist in the environment and that the current WQO was based on testing with East Coast species. A cyanide SSO for Puget Sound, Washington, using West Coast species has been approved by EPA Region X.

d. The Discharger participates in a regional discharger-funded effort to conduct a study for development of site-specific objective applicable to the Discharger's receiving water. The cyanide study plan was submitted on October 29, 2001. The Discharger is required to participate in the study, which will include submission of a final report to the Board by June 30, 2003. The Board intends to include, in a subsequent permit revision, a final limit based on the study results.

h. *Cyanide WQBELs.* There is insufficient cyanide background data currently available. Ambient cyanide data are being collected as required by the August 6, 2001 letter. The WQBELs for cyanide using the CTR saltwater criteria are calculated to be 0.4 μg/L as AMEL and 1 μg/L as MDEL for dry weather discharge. And compliance will be determined by comparing the effluent data with the SIP minimum level (ML) of cyanide, which is 5 μg/L.

i. *Cyanide Interim Limit.* Due to the lack of ambient background data for cyanide, the WQBELs for wet weather discharges, for which a dilution credit is granted, cannot be calculated. Furthermore, the Discharger has demonstrated that it is infeasible to immediately comply with the WQBELs established for dry weather discharges, for which no dilution credit is granted. Therefore, an interim limit based on the performance of 12 Bay Area dischargers with activated sludge treatment processes is developed. The monthly average effluent limit is set as the 99.87th percentile of the pooled cyanide effluent data, which is calculated to be 25 μg/L. This analysis can be found in **Attachment D (2):** Cyanide Pooled Data Analysis. The final WQBELs will be calculated based on addition ambient background information, and/or an SSO.

e. *Treatment Plant Performance and attainability with interim limit.* Effluent cyanide concentrations during the past eight months (1999-2002) range from <3 μg/L to 20 μg/L (22 samples). No cyanide concentrations exceed the interim limit of 25 μg/L.

14. Add the following paragraph as Finding 49.1:

49.1 If the Discharger wishes to request that the Board consider alternative percent removal requirement for BOD and TSS, the Discharger must satisfy all of the conditions under 40 CFR 133.103(d), Special Considerations. In addition, the Discharger may submit the results of a cost-effectiveness analysis to demonstrate conformance to then-current U.S. EPA guidance (applicable guidance is now called Sewer System Infrastructure Analysis and Rehabilitation, currently EPA, 1991, EPA/625/6-91/030).

15. Revise Effluent Limitations B(i)(7) and B(ii)(7)

(1). Revise the subtitle for B(i)(7) to read as:

7. Water Quality Based Effluent Limitations and Performance-based Effluent Limitations

(2). Replace Table 2 and Table 4 with Table 3 below:

Table 3. Effluent Limits for Wet and Dry Season Discharges [1]

CTR #	Constituent	Performance-Based Effluent Limit
		Monthly Average (μg/l)
6	Copper [2, 3, 4]	34
8	Mercury [2, 5]	0.087
14	Cyanide [2, 3, 6]	25

Footnote for Table 3:

1. (a) Compliance with these limits is intended to be achieved through secondary treatment and, as necessary, pretreatment and source control.
   (b) All analyses shall be performed using current U.S.EPA methods, or equivalent methods approved in writing by the Executive Officer.
   (c) Limits apply to the average concentration of all samples collected during the averaging period (Daily = 24-hour period; Monthly = calendar month).
   (d) All metal limits are in total recoverable.
   (e) The Discharger shall be deemed out of compliance with an effluent limitation if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported ML.
2. The interim limits will remain in effect until July 31, 2005 for copper and cyanide, and until March 31, 2010 for mercury, or until the Board amends the limit based on WLA and SSO. However, during the next permit reissuance, Board staff may re-evaluate the interim limits.
3. Without the site-specific ambient background data for the Discharger's receiving water, the dilution credit cannot be taken into account when calculating the WQBELs for wet weather discharges.
4. Copper: The Board may amend the limit based on additional effluent, background data and/or site-specific objectives for copper.
5. Mercury: effluent mercury monitoring shall be performed by using ultra-clean sampling and analysis techniques, with a method detection limit of 0.002 μg/L or lower.
6. Cyanide: compliance may be demonstrated by measurement of weak acid dissociable cyanide. The compliance will be determined by comparing effluent data with the SIP ML value. The Board may amend the limit based on additional effluent, background data and/or site-specific objectives for cyanide.

A detail WQBELs calculation can be found in **Attachment E**: Water Quality Based Effluent Limits (WQBELs) Calculation.

16. Remove the dioxin mass limit and relevant requirements from B(iii) - Limits and Criteria Applicable to Wet and Dry Season Discharge.

Table 5 - Mass Emissions for Wet and Dry Season Discharge

Constituent	~~Without American canyon~~ Mass Emission Limit
Mercury Mass Trigger	0.014 kg/month
Mercury Mass Limit	0.025 kg/month
~~Dioxin Mass Limit (2)~~	~~0.67 mg/month~~

Effluent limits B(iii)(d) - Mass limit-Dioxin and B(iii)(e) - Compliance-Dioxin are no longer applicable, and therefore removed.

17. Remove Provision F.3. - Mercury Reduction Study and Schedule.

18. Replace Provision F.12 and F.13 with the following Provision:

12. Effluent Characterization for Selected Constituents

The Discharger shall monitor and evaluate the discharged effluent for the constituents listed in Enclosure A of the Board's August 6, 2001 Letter. Compliance with this requirement shall be achieved in accordance with the specifications stated in the Board's August 6, 2001 Letter under Effluent Monitoring for major dischargers. Interim and final reports shall be submitted to the Board in accordance with the schedule specified below (same schedule is also specified in August 6, 2001 Letter):

Interim and Final Reports: An interim report is due on May 18, 2003. The report should summarize the data collected to date, and describe future monitoring to take place. A final report that presents all the data shall be submitted to the Board by January 31, 2005 (180 days prior to the permit expiration date). This final report shall be submitted with the application for permit reissuance.

Revised study plan: The Discharger submitted a study plan dated July 11, 2001 proposing the approach for effluent sampling. With the revision of Provision 12 and Provision 13, the Discharger is required to submit a revised study plan by November 15, 2002, which should include a time schedule for the monitoring. The Discharger shall initiate the monitoring within 30 days after the Executive Officer approves the study plan.

With this change, the requirement for the Discharger to investigate the cost-effectiveness of improving solids removal from its discharge specified in Provision F.12 is removed. Also with this revision, all references to the year-round monitoring requirement are removed.

19. Revise Provision F. 22 to read as follows:

22. Reopener

The Board may modify, or revoke and reissue, this Order and Permit if present or future investigations demonstrate that the discharge(s) governed by this Order will cause, have the potential to cause, or will contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters. In addition, the Board may review and revise requirements pursuant to California Water Code Section 13263 (e).

This Order becomes effective on January 1, 2003, and expires on July 31, 2005. The Discharger must file a Report of Waste Discharge in accordance with Title 23 of the California Administrative Code not later than 180 days before this expiration date as application for reissuance of waste discharge requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 16, 2002.

Loretta K. Barsamian

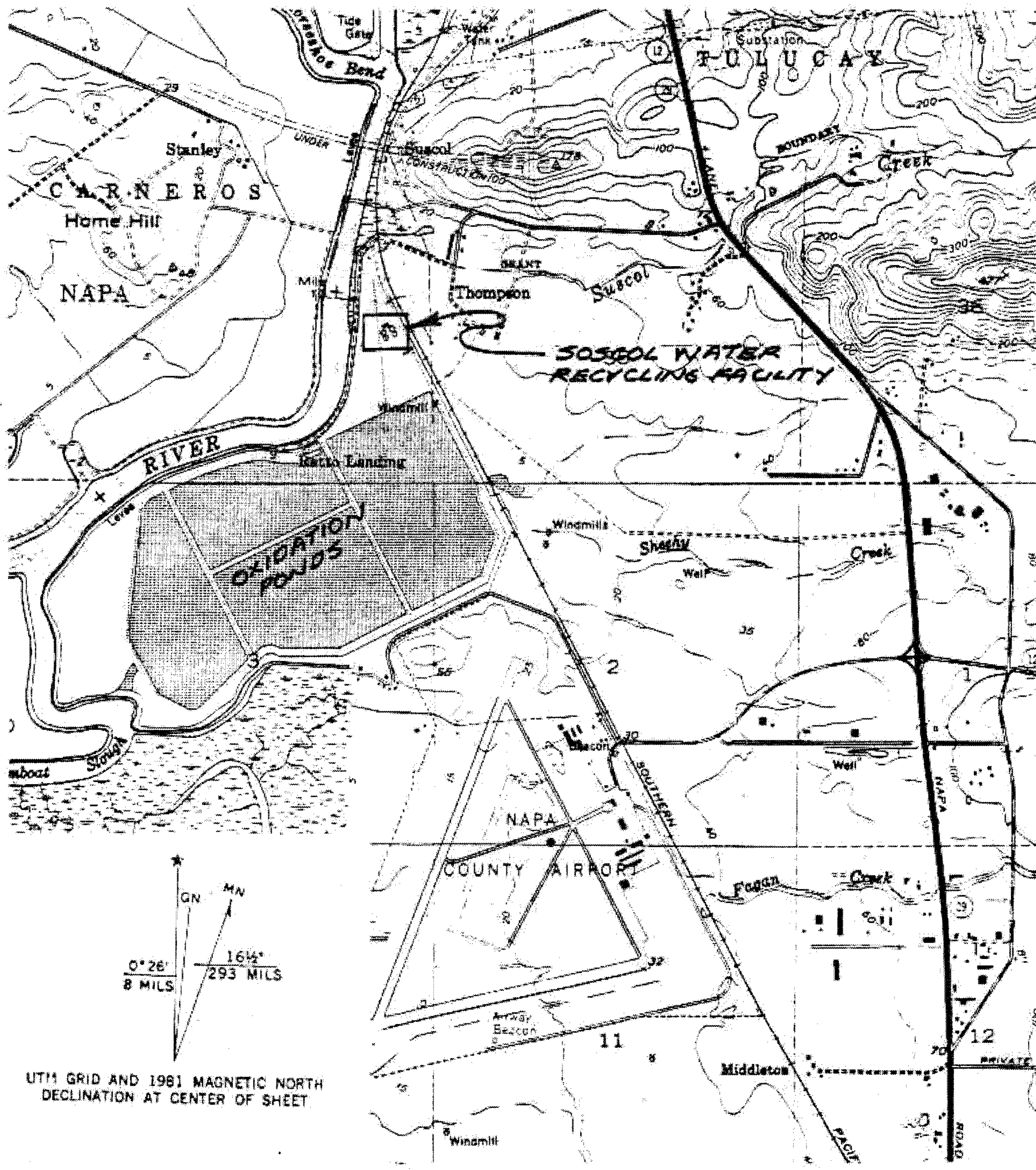
Loretta K. Barsamian
Executive Officer

ATTACHMENT

A. Site Location Map
B. Treatment Process Flow Diagram
C. Time Series Plot for Selected Heavy Metals and Cyanide
D. (1) Copper Pooled Data Analysis
   (2) Cyanide Pooled Data Analysis
E. Water Quality Based Effluent Limits (WQBELs) Calculation
F. Priority Pollutant Sampling Data: Heavy metals, cyanide, selenium
G. Napa Sanitation District Feasibility Study for NPDES Permit Amendment, August 23, 2002, and Supplemental Information, September 26, 2002
H. Antidegradation Analysis for the Napa Sanitation District Water Recycling Facility, August 23, 2002, and Supplemental Information, September 26, 2002

Attachment A

Site Location Map



LOCATION MAP
FROM U.S. GEOLOGICAL SURVEY MAP,
PHOTOREVISED 1981
SOSCOL WATER RECYCLING FACILITY
NAPA, CALIFORNIA

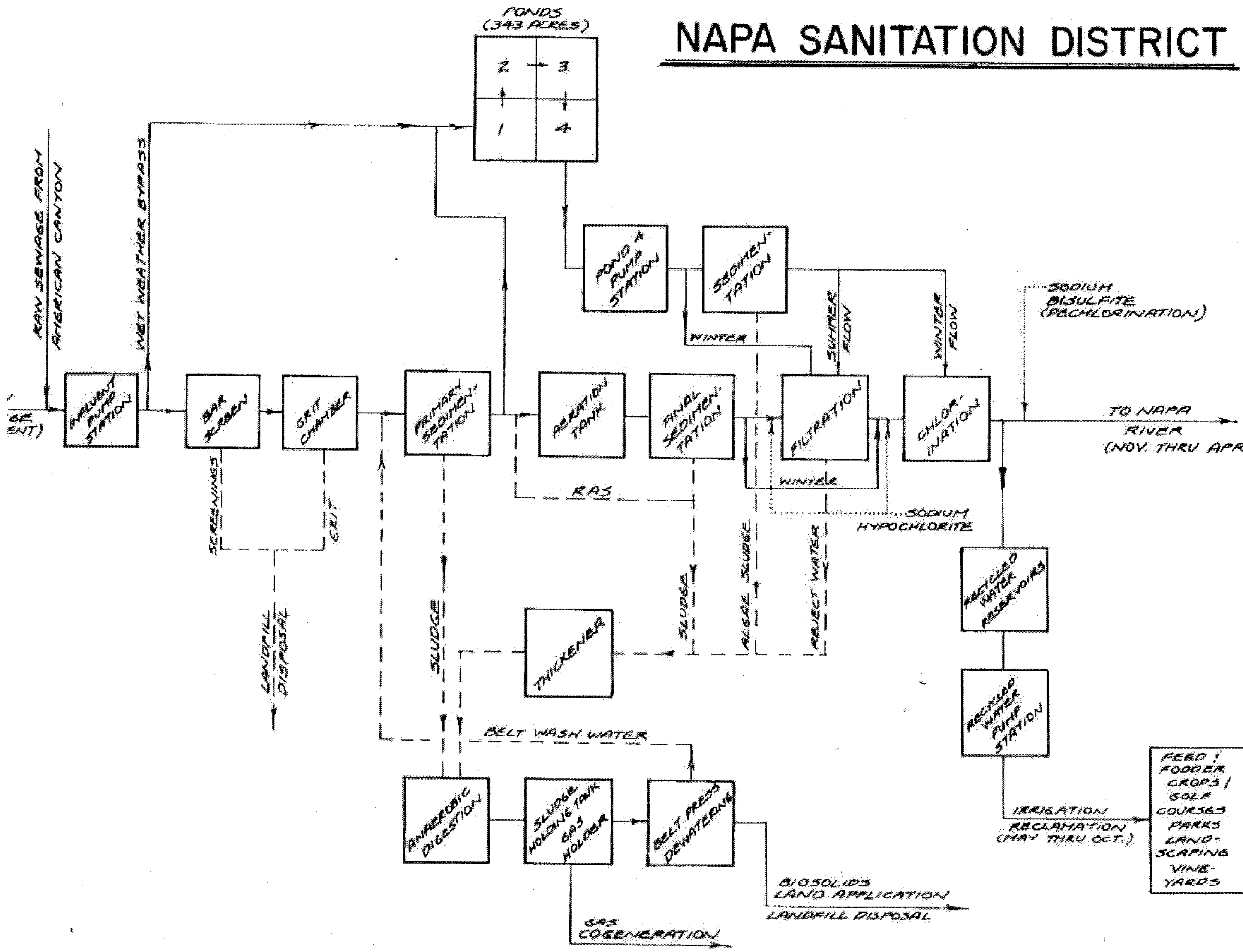
SEPTEMBER, 1998 SHT 1 of 1

ATTACHMENT A

Attachment B

Treatment Process Diagram

NAPA SANITATION DISTRICT

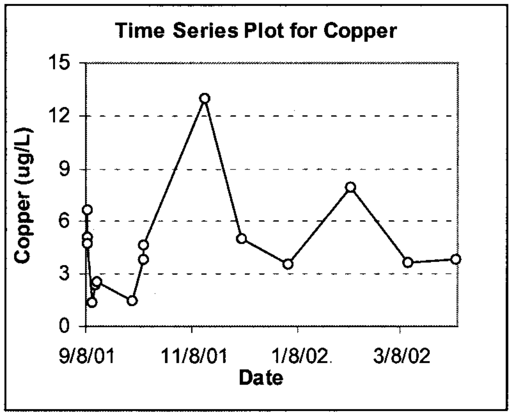


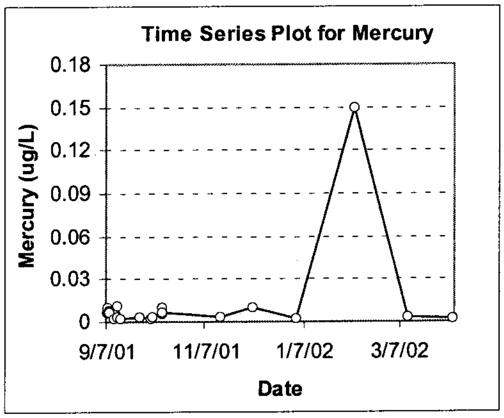
Attachment C

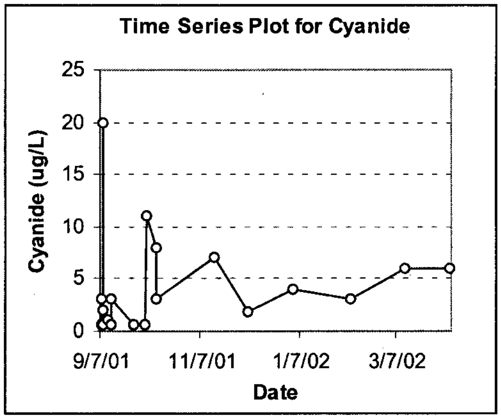
Time Series Plot for Selected Heavy Metals and Cyanide Effluent Data (September 2001- April 2002)

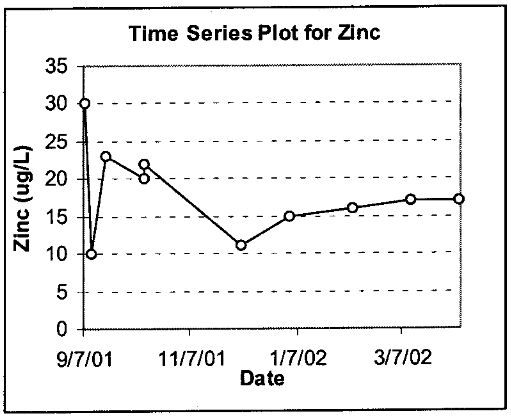
ATTACHMENT C

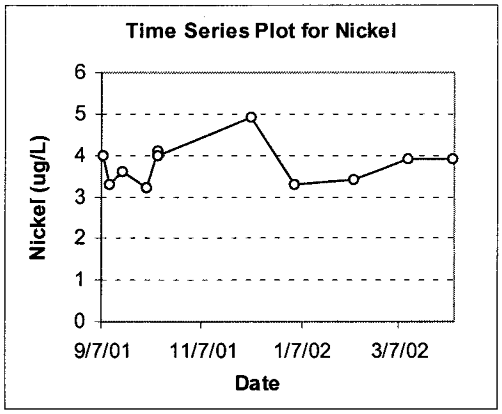
TIME SERIES PLOTS FOR SELECTED HEAVY METALS AND CYANIDE

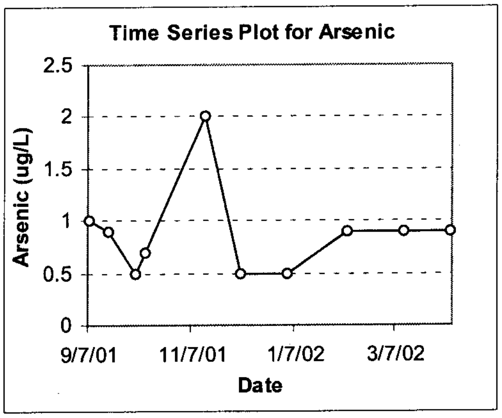












Attachment D (1)

Copper Pooled Data Analysis

ATTACHMENT D(1)

Copper Pooled Data Analysis

1. Basis statistics of pooled data.

The following is a basic statistics of all available copper data (time period varies between 1998-2002) from 10 POTWs with activated sludge system, which are Burlingame, CCCSD, Millbrae, North San Mateo, Rodeo, S.F. Airport, City of San Mateo, SBSA, South SF, and SVCSD. Data from SBSA and SVCSD are monthly averages if more than 1 sample is available in a month.

Descriptive Statistics: Copper (ug/L)

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Copper	394	8.972	8.000	8.389	5.306	0.267

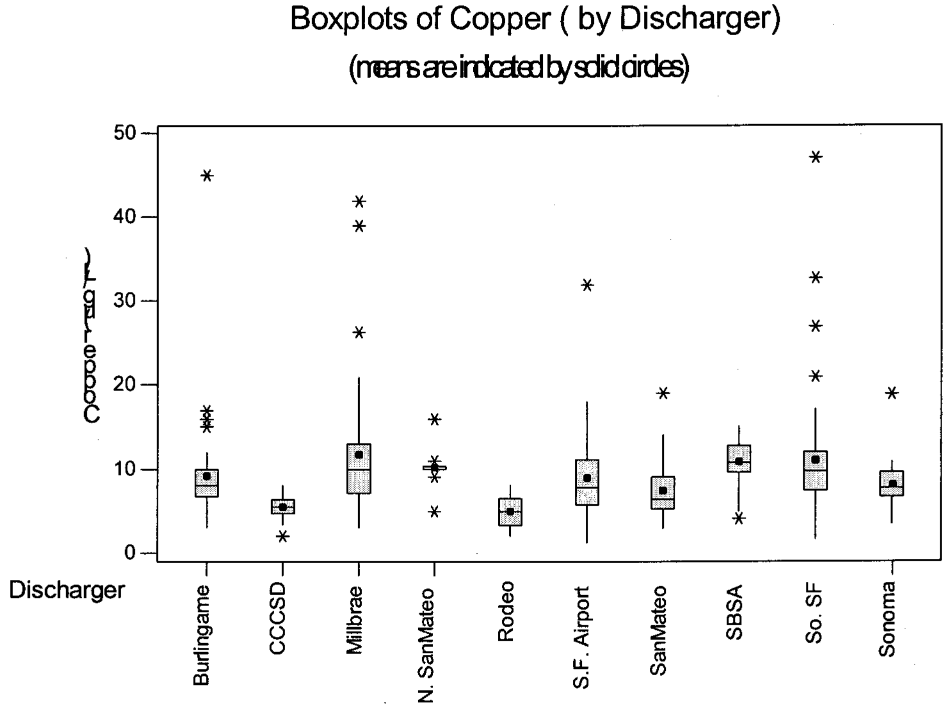
Variable	Minimum	Maximum	Q1	Q3
Copper	1.200	47.000	6.000	10.500

Descriptive Statistics: Copper (ug/L) by Discharger

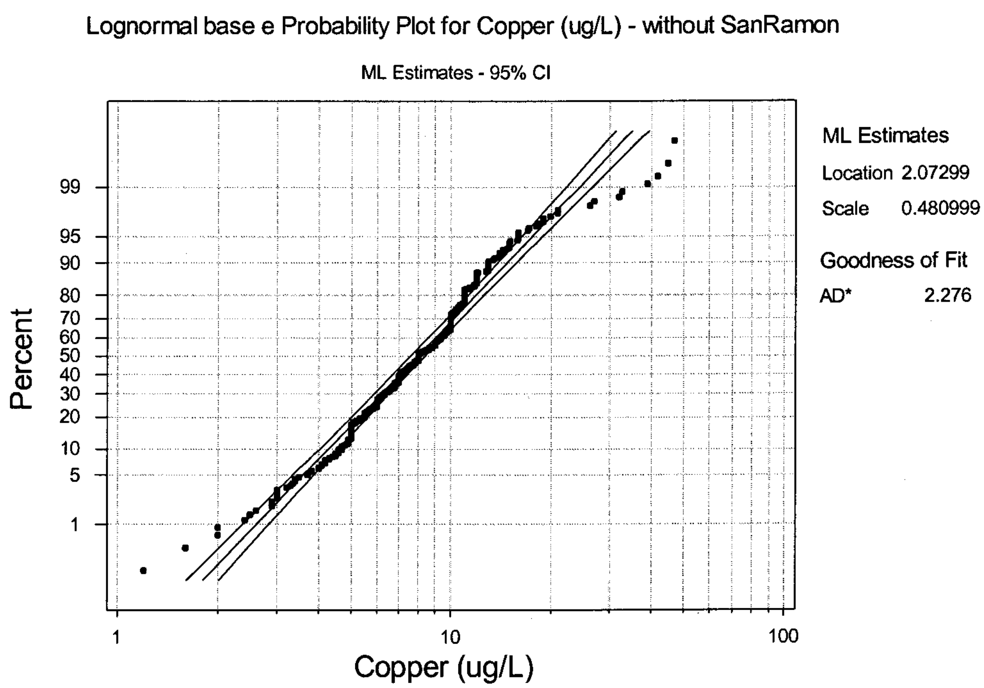
Variable	Discharger	N	Mean	Median	TrMean	StDev
Copper	Burlingame	55	9.205	8.000	8.476	5.684
	CCCSD	37	5.457	5.500	5.476	1.290
	Millbrae	43	11.73	10.00	10.65	7.90
	N. SanMateo	16	10.150	10.000	10.100	2.062
	Rodeo	25	4.988	5.000	4.987	1.735
	S.F. Air	40	8.890	7.750	8.386	5.311
	SanMateo	39	7.392	6.300	7.117	3.208
	SBSA	44	10.793	10.650	10.899	2.644
	So. SF	53	10.90	9.70	9.83	7.32
	Sonoma	42	8.069	7.600	7.919	2.455

Variable	Discharger	SE Mean	Minimum	Maximum	Q1	Q3
Copper	Burlingame	0.766	3.000	45.000	6.800	10.000
	CCCSD	0.212	2.000	8.000	4.650	6.400
	Millbrae	1.20	3.00	42.00	7.10	13.00
	N. SanMateo	0.516	5.000	16.000	10.000	10.300
	Rodeo	0.347	2.000	8.000	3.300	6.500
	S.F. Air	0.840	1.200	32.000	5.750	11.075
	SanMateo	0.514	2.900	19.000	5.200	9.000
	SBSA	0.399	4.000	15.020	9.521	12.750
	So. SF	1.00	1.60	47.00	7.35	12.00
	Sonoma	0.379	3.360	18.950	6.570	9.496

2. Box plot of the copper effluent concentration by discharger.



3. Probability distribution analysis using Mini Tab.



99.87^{th} percentile = **33.8 ug/L**

4. Summary:

The performance based effluent limit derived from 10 POTWs with activated sludge treatment system is **34 ug/L**, and is used as the monthly average interim limit.

Attachment D (2)

Cyanide Pooled Data Analysis

ATTACHMENT D (2)

Cyanide Pooled Data Analysis

1. Basic statistics of the pooled data.

The following is a basic statistics of all available cyanide data (time period varies between 1998-2002) from 12 POTWs with activated sludge system, which are Burlingame, CCCSD, Dublin San Ramon, EBMUD, Millbrae, North San Mateo, Rodeo, S.F. Airport, City of San Mateo, SBSA, South SF, and SVCSD. Data from EBMUD and SBSA are monthly averages if more than 1 sample is available in a month. Since there are large amounts of non-detected values, the Mini Tab Censored Data Macro – MDL is used to calculate the statistics of the pooled data set.

Variable	N	Mean	Median	TrMean	StDev	SE Mean
ESTIMATE	**483**	4.693	3.993	4.330	3.495	0.159

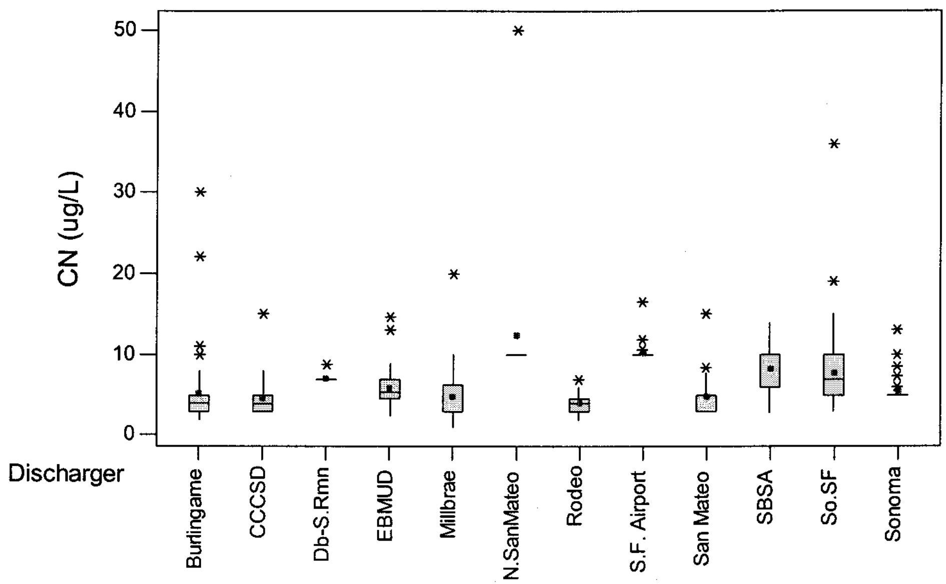
Variable	Minimum	Maximum	Q1	Q3
ESTIMATE	0.711	36.000	2.483	5.898

No. of Non-detects/ No. of detects = 254 / 239
Percentage of non-detects = **52.6 %**

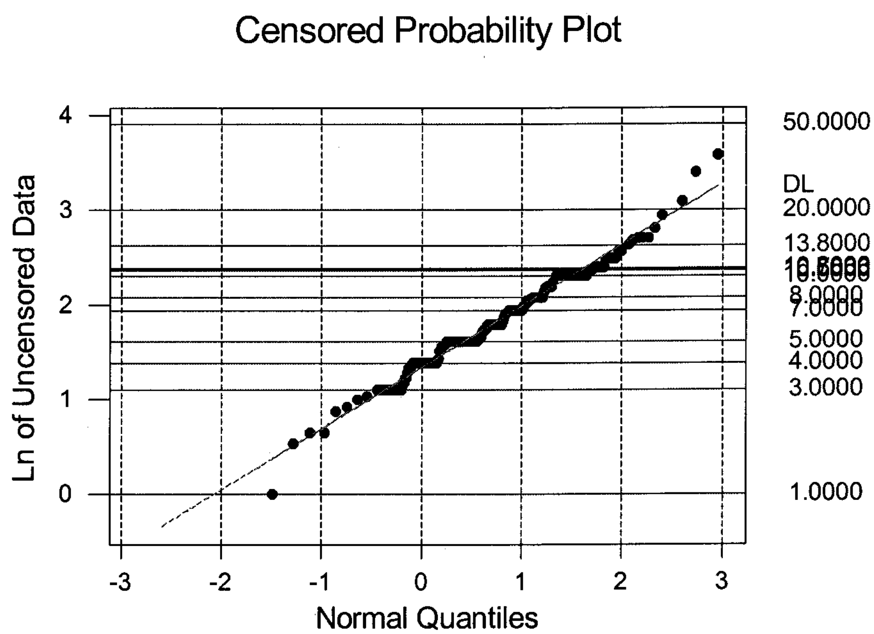
2. **Boxplot shows the distribution of the data by discharger** (the highest value of 50 ug/L for N. San Mateo is an detection limit).

Boxplots of CN (ug/L) by Discharger

(means are indicated by solid circles)



3. Use MiniTab MDL Macro to fit the lognormal distribution to the data.



Descriptive Statistics for log transformed cyanide data: ESTIMATE (using probability regression method)

Variable	N	Mean	Median	TrMean	StDev	SE Mean
ESTIMATE	483	1.3422	1.3846	1.3407	0.6314	0.0287

Variable	Minimum	Maximum	Q1	Q3
ESTIMATE	-0.3404	3.5835	0.9096	1.7747

The 99.87th percentile = exp(mean+3*StDev) = exp(1.3422+3*0.6314) = **25 ug/L.**

Summary:

1. All available data points are kept in the analysis.
2. Data from EBMUD and SBSA are monthly averages calculated from more than 1 sample each month.
3. Censored data analysis macro is used to fit a distribution to the data. The 99.87th percentile is **25 ug/L**, as the monthly average interim limit.

Attachment E

Water Quality Based Effluent Limits (WQBELs) Calculation for Copper, Mercury, and Cyanide

ATTACHMENT E

Water Quality Based Effluent Limitation (WQBEL) Calculation

PRIORITY POLLUTANTS	Copper	Mercury	Cyanide
Basis and Criteria type	CTR, sw ug/L	BP, sw ug/L	CTR, sw ug/L
Lowest WQO	3.1	0.025	1
Translator (if applicable)	0.85		
Applicable Acute WQO	5.05	2.1	5
Applicable Chronic WQO	3.65	0.025	1
Applicable HH criterion		0.051	
Background	NA	NA	NA
Avg bckgrnd (for HH criteria only)		NA	
ECA acute	5.05	2.1	1
ECA chronic	3.65	0.025	1
avg (1)	2.912	0.0055	4.3524
SD (1)	4.673	0.0029	4.2636
CV (1)	0.623	0.5367	1.0208
ECA acute mult	0.3110	0.3521	0.2002
ECA chronic mult	0.5161	0.5607	0.3666
LTA acute	1.5704	0.7395	0.2002
LTA chronic	1.8821	0.0140	0.3666
minimum of LTAs	1.5704	0.0140	0.2002
AMEL mult95	1.5751	1.4904	1.9655
MDEL mult99	3.2158	2.8397	4.9948
AMEL (aq life)	2.4735	0.0209	0.3935
MDEL(aq life)	5.05	0.04	1
MDEL/AMEL Multiplier		2.01	
AMEL (HH-human health)		0.051	
MDEL (HH-human health)		0.10251	
minimum of AMEL for Aq. life vs HH	2.5	0.021	0.4
minimum of MDEL for Aq. Life vs HH	5.1	0.040	1.0
Final limit - AMEL	2.5	0.021	0.4
Final limit - MDEL	5.1	0.040	1.0

	Copper (no dilution)	Mercury (dilution is not allowed)	Cyanide (no dilution)
AMEL (ug/L)	2.5	0.021	0.4
MDEL (ug/L)	5.1	0.040	1.0

Note (1) Calculations of average, std dev and CV for mercury are based on the effluent data without the high effluent data point 0.15 ug/L.

Attachment F

Priority Pollutant Sampling Data:
Heavy Metals, Cyanide, and Selenium

ATTACHMENT F

Priority Pollutant Sampling Data: Heavy metals, cyanide, and selenium

Date	As (ug/L)	Cr (ug/L)	Cd (ug/L)	Cu (ug/L)	Pb (ug/L)	Hg (ug/L)	Ni (ug/L)	Ag (ug/L)	Zn (ug/L)	CN (ug/L)	Se (ug/L)
9/7/2001 Grab	**1**	< 0.5	< 0.1		< 0.25	**0.0072**	**4**	**0.1**	**30**	< 0.6	< 1
9/7/2001 Grab Split						**0.0098**				< 3	
9/8/01 24HRC				**5.1**		**0.0077**				**2**	
9/8/01 24HRC Split				**6.7**		**0.008**				**20**	
9/8/01 24HRC METM				**4.8**		**0.0073**				< 0.6	
9/11/01 24HRC	**0.7**	< 0.5	< 0.1	**1.4**	< 0.25	**0.0018**	**3.3**	< 0.1	**10**	**1**	< 1
9/13/01 Grab						**0.0033**				< 0.6	
9/13/01 Grab Split						**0.0032**				< 3	
9/13/01 24HRC				**2.4**		**0.011**				< 0.6	
9/13/01 24HRC METM										**3**	
9/14/01 24HRC METM				**2.6**							
9/15/01 24HRC P2 Add						**0.0019**					
9/19/2001	**0.9**	< 0.5	< 0.1		< 0.25		**3.6**	< 0.1	**23**		< 1
9/27/01 24HRC METM						**0.0036**				< 0.6	
10/4/01 24HRC		< 0.5	< 0.1	**1.5**	< 0.3	**0.0026**	**3.2**	< 0.1	**12**	< 0.6	< 1
10/5/01 Grab	< 0.5	< 0.5				**0.0033**				**11**	
10/11/01 Grab						**0.0052**				**8**	
10/11/01 24HRC	**0.7**	**0.6**	< 0.1	**3.8**	**0.4**	**0.0056**	**4.1**	**0.2**	**20**	< 3	< 1
10/11/01 Grab Split						**0.0098**				< 3	
10/11/01 24HRC Split				**4.7**		**0.0062**	**4**	< 0.2	**22**		**5**
11/15/2001	**2**	**0.6**	< 0.2	**13**	< 0.5					**7**	
11/16/2001						**0.0039**					
12/6/2001	< 0.5	**0.7**	< 0.1	**5**	< 0.25	**0.01**	**4.9**	**0.2**	**11**	**1.8**	< 1
1/2/2002	< 0.5	< 0.5	< 0.1	**3.6**	**0.25**	**0.0026**	**3.3**	< 0.1	**15**	**4**	< 1
2/7/2002	**0.9**	< 0.5	< 0.1	**8**	**0.3**	**0.15**	**3.4**	**0.3**	**16**	< 3	< 1
3/12/2002	**0.9**	< 0.5	< 0.1	**3.7**	< 0.25	**0.0038**	**3.9**	< 0.1	**17**	**6**	< 1
4/9/2002	**0.9**	< 0.5	< 0.1	**3.8**	< 0.25	**0.0026**	**3.9**	< 0.1	**17**	**6**	< 1

Attachment G

Napa Sanitation District Feasibility Study for NPDES Permit Amendment August 23, 2002 and Supplemental Information, September 26, 2002

Napa Sanitation District Feasibility Study for NPDES Permit Amendment

August 23, 2002

I. INTRODUCTION

This study of the feasibility of achieving compliance with proposed final effluent limits for copper, mercury, and cyanide is being provided in response to the water quality-based effluent limits that are proposed in the August 9, 2002 Administrative Draft of NPDES Permit Amendment, transmitted by Shin Roei-Lee to Mike Alexander of the Napa Sanitation District (District).

II. BACKGROUND

Basis for Feasibility Studies

The requirement for feasibility studies as a way to document the need for interim effluent limits was first suggested on May 3, 2001, and further defined in a May 11, 2001, meeting between representatives of Bay area dischargers, the RWQCB, the U. S. Environmental Protection Agency (USEPA), and the State Water Resources Control Board (SWRCB). Five Bay area dischargers submitted feasibility studies to the RWQCB in May and had their permits adopted in June, with effluent limits based on those studies.

There are two bases for the feasibility analysis: 1) the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (known as the SIP - March 2000) which establishes statewide policy for NPDES permitting, and 2) the RWQCB's Basin Plan, 1995. The SIP provides for the situation where an existing NPDES discharger cannot immediately comply with an effluent limitation derived from a California Toxics Rule (CTR) criterion. The SIP allows for the adoption of interim effluent limits and a schedule to achieve compliance with a water quality-based effluent limit in such cases. To qualify for interim limits and a compliance schedule, the discharger must demonstrate that it is infeasible to achieve immediate compliance with the CTR-based limit.

The term "infeasible" is defined in the SIP as "not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

The SIP requires that the following information be submitted to the RWQCB to support a finding of infeasibility:

- Documentation that diligent efforts have been made to quantify pollutant levels in the discharge and sources of the pollutant in the waste stream, including the results of those efforts;
- Documentation of source control and/or pollution minimization efforts currently underway or completed;

- A proposed schedule for additional or future source control measures, pollutant minimization, or waste treatment; and
- A demonstration that the proposed schedule is as short as practicable.

The SIP requires that interim numeric effluent limits be based on (a) current treatment facility performance or (b) limits in the existing permit, whichever is more stringent.

The SIP also requires that compliance schedules be limited to specific time periods. For constituents not on the 303(d) list, the maximum length of the compliance schedule is five years from the date of permit issuance. For constituents on the 303(d) list (where a TMDL is required to be prepared), the maximum length of the compliance schedule is 20 years from the effective date of the SIP (March 2000). To secure the TMDL-based compliance schedule, the discharger must make commitments to support and expedite development of the associated TMDL.

In similar fashion, when a NPDES discharger cannot immediately comply with an effluent limitation from a Basin Plan criterion, the Basin Plan allows the RWQCB to consider the discharger's proposals for longer compliance schedules where the revised effluent limitation will not be immediately met. The Basin Plan justification for compliance schedules is essentially the same as the SIP procedure. Both procedures require implementation of pollution prevention measures to reduce constituent of concern (COC) loadings to the maximum extent practicable as soon as possible.

Feasibility Study for Napa Sanitation District

It is the District's understanding that the District must demonstrate that it is infeasible to meet the final effluent limits for copper, mercury, and cyanide in order to be granted a compliance schedule and interim effluent limits in the amendment to the NPDES permit. It is also the District's understanding that the feasibility studies already produced by other dischargers were sufficient to prove inability to comply with the proposed final water quality-based effluent limits. Hence, this analysis is generally based on those previous examples.

The RWQCB will determine if a compliance schedule and interim limits are appropriate, based on the discharger's submittal. If the RWQCB agrees that immediate compliance is infeasible, and that all the conditions are met, a compliance schedule and interim limit can be established on a constituent-by-constituent basis. Accordingly, if the RWQCB believes that a compliance schedule and interim limits are not justified by this submittal for one or more of the COCs, the District requests that the RWQCB hold the adoption of the Tentative Order (TO) in abeyance until additional data can be provided to allow full consideration of the District's inability to immediately comply with the subject final water quality-based effluent limits.

III. CONSTITUENTS TO BE EVALUATED

The August 9, 2002 Draft Tentative Order (Administrative Draft) of the NPDES Permit Amendment contains WQBELs for the following constituents:

- Copper
- Mercury
- Cyanide

Consequently, these three constituents are the subjects of this feasibility analysis.

IV. PROPOSED WATER QUALITY BASED EFFLUENT LIMITS AND CURRENT PLANT PERFORMANCE FOR CONSTITUENTS OF CONCERN

The RWQCB proposed final water quality-based effluent limits for the District in the Draft Tentative Order (Administrative Draft) of the NPDES Permit Amendment, transmitted to the District on August 9, 2002. The proposed final limits and the District's effluent quality are summarized in Table 1.

Effluent quality in Table 1 is based on data from sampling conducted between September 2001 and April 2002, the same timeframe used in the Administrative Draft. The Administrative Draft states: "When Order No. 00-059 was adopted, the Discharger was in the process of constructing the new activated sludge (AS) treatment system. In September 2001, the new AS system was put on-line, treating up to 8 mgd wastewater. AS systems are more reliable and effective for the quantities of flow being treated at the Discharger's facility, approximately 14 mgd. However, AS systems are generally not as effective at removing metals as oxidation ponds. In light of this fact, it is necessary to perform the reasonable potential analysis (RPA) based on the data collected from the new treatment processes, which include AS treatment system as well as the oxidation ponds."

Consequently, the same data as was used in the RPA is used as the basis of this feasibility study. It should be noted, however, that the data that have been used to conduct the assessment of treatment plant performance, upon which the RPA and this analysis are based, are limited because the activated sludge unit has been operating for less than a year. Additionally, there are several unknowns related to the future operation and performance of the plant. Therefore, there is significant uncertainty regarding whether this data set is representative of long-term treatment plant performance.

Table 1. Final Effluent Limits and Effluent Quality

CTR#	Constituent	Final Water Quality Based Effluent Limits (WQBELs) (ug/L)				Napa Sanitary District Effluent Quality (MEC[3]) (ug/L)
		Wet Weather		Dry Weather		
		AMEL[1]	MDEL[2]	AMEL[1]	MDEL[2]	
6	Copper	--[4]	--[4]	2.5	5.1	13
8	Mercury	0.013[5]	0.041[5]	0.013	0.041	0.15
14	Cyanide	--[4]	--[4]	0.4	1.0	20

[1]AMEL= Average Monthly Effluent Limit
[2]MDEL= Maximum Daily Effluent Limit
[3]MEC= Maximum Effluent Concentration observed in the dataset (9/01-4/02)

[4] Because site-specific background data is unavailable, WQBELs for wet weather with dilution credit are unable to be calculated at this time. The District is participating in a group effort to collect background data as required by a Regional Board 13267 letter.
[5]Wet weather WQBELs can be calculated for mercury because no dilution credit is allowed, and therefore site-specific background data is not needed in order to calculate the limits.

It is the District's understanding that the water quality-based effluent limits shown in Table 1 were calculated using procedures described in Section 1.4 of the SIP. However, due to the short time frame allowed for submission of this Feasibility Study, the District did not have time to check the calculations nor the effluent dataset. The District plans to review these data and calculations in the near future. Consequently, all numerical analyses contained in this study rely on the data provided in the Permit Amendment Administrative Draft by the Regional Board.

FEASIBILITY ANALYSIS

As shown in Table 1, based upon current treatment plant performance as measured using plant effluent, the District is unlikely to be able to immediately comply with proposed final effluent limits for the three COCs. In addition, it should be noted again that the data set used to conduct the assessment of treatment plant performance is limited because the activated sludge unit has been operating for less than a year. Additionally, there are several unknowns related to the future operation and performance of the plant. Therefore, there is significant uncertainty regarding whether this data set is representative of long-term treatment plant performance.

As a result of the District's inability to immediately comply with effluent limits, interim effluent limits and a compliance schedule to attempt to meet final limits should be granted in the amendment to the NPDES permit. Alternatively, due to the lack of data for the current and future treatment process, the Regional Board could impose monitoring requirements and the effluent limits contained in Table 4-3 of the Basin Plan in the interim while additional data is collected as authorized under the SIP.

Copper

Treatment plant performance and the District's pollution prevention program targeting copper are discussed below.

District effluent characteristics for copper indicate that immediate compliance with the final effluent limits is unlikely. For the period of September 2001-April 2002, the effluent copper concentrations ranged from 1.4 ug/L to 13 ug/L (15 samples). The maximum observed effluent concentration of 13 ug/L would result in permit violations at the proposed dry weather AMEL of 2.5 ug/L and MDEL of 5.1 ug/L. Of the 15 samples, 12 or 80% exceeded the AMEL and three or 20% exceeded the MDEL. Because no final limits for wet weather discharge could be calculated, interim limits for wet weather must be granted. Therefore, interim effluent limits for copper for both wet and dry weather and a compliance schedule to attempt to meet final copper limits should be granted. Alternatively, due to the lack of data for the current and future treatment process, the Regional Board could impose monitoring requirements and the effluent limits contained in Table 4-3 of the Basin Plan in the interim while additional data is collected as authorized under the SIP.

The District's pollution prevention program has worked with copper sources over the years including vehicle services facilities, household products, and corrosion.

The District worked with the Association of Bay Area Governments to develop a Green Business Recognition Program for Automotive Service Facilities between 1997 and 1999. The focus of this program encouraged businesses to seal floor drains and to conduct repair activities as dry shops. Inspections revealed that as a result of this program, the majority of vehicle service facilities were operating in the recommended manner. Inspections of several autobody shops this summer (2002) revealed that these businesses are also conducting service and repair activities in dry shops with no discharges from these activities to the sanitary sewer. The current focus of the District's P2 program for vehicle service facilities has, therefore, shifted to vehicle washing activities. Inspections at the autobody shops revealed that vehicle washwater was being disposed of in a variety of ways. Most shops were discharging to the sanitary sewer. The District is working with these shops to ensure that discharges are adequately treated prior to discharge. A few shops were discharging washwater to the storm drain. The District is working with these facilities to redirect their discharges to landscaping or the sanitary sewer.

The District participated in the Bay Area Pollution Prevention Group's (BAPPG) efforts in the mid –1990's to educate the public regarding copper sulfate root control products by participating in the workgroup that developed the brochure. This brochure was distributed by the District at all household hazardous waste collection events prior to the ban on this product. The District also worked with the Napa County Agricultural Commission to educate the public regarding the ban once it was implemented.

In 2001, the District met with the City of Napa to discuss the impacts of the City's water supply on copper levels entering the treatment plant. The City provided information regarding the use of copper sulfate in one of its reservoirs and information on its corrosion control efforts (orthophosphate is added to the source water). In addition, the City provided five years of water supply data for the District's review. The District will continue to analyze this copper source and work with the City as necessary.

Current pollution prevention efforts include revitalizing the District's Commercial Business Program, which will target several commercial categories over the next several years. This program will include information and data gathering, facility visits, and recommendations of Best Management Practices (BMPs) for reducing constituents of concern. The four commercial categories identified are automotive, restaurants, dental offices, and drycleaners. As noted above, efforts targeting automotive businesses are already underway.

The District is also participating in regional copper-related activities and is in the process of conducting a copper translator study. The District is participating in the North Bay Copper and Nickel Impairment Assessment to Assist in Preparation of the 2002 303(d) list. The District is participating with other dischargers through the Bay Area Clean

Water Agencies (BACWA) with the RWQCB, USEPA, and BayKeeper in the development of information regarding copper toxicity in San Francisco Bay north of the Dumbarton Bridge. The work is expected to lead to a removal of the 303(d) listing for copper in the Bay and development of revised water quality objectives for copper in the Bay.

Mercury

Treatment plant performance and the District's pollution prevention program targeting mercury are discussed below.

For the period of September 2001-April 2002, the effluent mercury concentrations ranged from 0.0018 ug/L to 0.15 ug/L (23 samples). As the permit amendment explains: "There is one extreme effluent value (0.15 ug/L) which is 30 times higher than the average effluent concentration for the study period. Board staff examined the data and found that the influent mercury concentration for the same month was also much higher than that of the other months. Therefore, it is concluded that this extremely high effluent concentration was caused by a rare event, and is not representative of the treatment plant's performance." The District believes this rare event (due to sampling and/or analytical variability or a one-time, temporary discharge of mercury into the sewer system) is a basis for throwing out this data point from the dataset. If this were to occur, the District would not have reasonable potential for mercury, and no effluent limits for mercury would be required.

However, if the Regional Board insists on including this data point and giving the District reasonable potential for mercury, then the data point must also be included in the Feasibility Analysis. The observed MEC concentration of 0.15 ug/L would result in permit violations at the proposed AMELs of 0.013 ug/L and MDELs of 0.041 ug/L. Therefore, interim effluent limits for mercury and a compliance schedule to attempt to meet final mercury limits should be granted. Alternatively, due to the lack of data for the current and future treatment process, the Regional Board could impose monitoring requirements and the effluent limits contained in Table 4-3 of the Basin Plan in the interim while additional data is collected as authorized under the SIP.

The District's past pollution prevention efforts targeting mercury include a mercury thermometer exchange program. The Napa Sanitation District provided funds for the Napa-Solano County Agencies' joint effort mercury thermometer exchange event, where 300 mercury-free thermometers were exchanged between April 30 and May 11, 2001. The mercury thermometer exchange program was also discussed in an article (Summer 2001) in "Pipeline", a newsletter from the District.

The District is revitalizing its Commercial Business Program, which will target several commercial categories over the next several years. This program will include information and data gathering, facility visits, and recommendations of Best Management Practices (BMPs) for reducing constituents of concern. The four commercial categories identified are automotive, restaurants, dental offices, and drycleaners. Dental offices are a known source of mercury into the sewer system, and this program will target that source.

In addition to efforts targeting dentists and household products (e.g., thermometers) other activities targeting mercury include:

- Monitoring influent for mercury using clean sampling techniques and analytical techniques using low detection limits
- Contributing to development of the mercury TMDL through membership in Bay Area Clean Water Agencies (BACWA)
- Continuing to participate in the Bay Area Pollution Prevention Group (BAPPG)
- Reviewing white papers, policies and procedures developed by the BAPPG and evaluating feasibility and potential effectiveness of activities for the District
- Monitoring changes in the District's influent and effluent resulting from these efforts, and evaluating next steps

Cyanide

Treatment plant performance and the District's pollution prevention program targeting cyanide are discussed below.

District effluent characteristics for cyanide indicate that immediate compliance with the final effluent limits based on the CTR is unlikely. However, an effluent limitation from Table 4-3 of the Basin Plan could be met and might be considered as an alternative limit. Effluent cyanide concentrations during the September 2001 through April 2002 period range from <0.6 ug/L to 20 ug/L (22 samples). The maximum observed effluent concentration of 20 ug/L would result in permit violations at the proposed dry weather AMEL of 0.4 ug/L and MDEL of 1 ug/L. All the samples either exceed the AMEL or are below detection limits. Additionally, the SIP minimum level (ML) for cyanide is 5 ug/L. Six of the 22 samples exceed the ML. Because no final limits for wet weather discharge could be calculated, interim limits for wet weather must be granted. Therefore, interim effluent limits for cyanide for both wet and dry weather and a compliance schedule to attempt to meet final cyanide limits should be granted. Alternatively, due to the lack of data for the current and future treatment process, the Regional Board could impose monitoring requirements and the effluent limits contained in Table 4-3 of the Basin Plan in the interim while additional data is collected as authorized under the SIP.

As the permit amendment notes: "Cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix inferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. This question is being explored in a national research study sponsored by the Water Environment Research Foundation (WERF)."

The District has concerns about the occurrence of artifactual (false positive) cyanide as evidenced by effluent concentrations greater than influent concentrations. The District supports efforts to develop a site-specific objective for cyanide in the Bay, given that cyanide does not persist in the environment and that the current WQO was based on testing with East Coast species. A cyanide SSO for Puget Sound, Washington, using West Coast species has been approved by EPA Region X. The Discharger participates in a regional discharger-funded effort to conduct a study for development of site-specific objective. The cyanide study plan was submitted on October 29, 2001. A final report will be submitted to the Board by June 30, 2003. The Board intends to include, in a subsequent permit revision, a final limit based on the study results.

General Pollution Prevention Activities

Other pollution prevention activities and the structure of the District's program are discussed below.

The District conducts ongoing pollution prevention activities that that focus on general education rather than targeting specific pollutants. Two specific projects that have been under development in 2002 are the Vintage High School project and modification of plant tours. The District has worked on various projects with the Environmental Science Program at Vintage High School in Napa over the years. In 2002, District staff are working with Ted Migdal of Vintage High to develop a project for students to conduct a pollution prevention audit of their school with a specific focus on sources of copper and mercury in the school. A curriculum has been developed with the plan of using it in Fall, 2002. In addition, the District is developing a new script for its plant tours that incorporates more information on pollution prevention. Plant tours are conducted throughout the year to school groups and other organizations. In conjunction with the new tour script, a quiz will be developed to evaluate how effective these tours are with respect to educating the public on pollution prevention issues. Other ongoing public education and pollution prevention activities include:

- Recycling/ Household Hazardous Waste Hotline conducted jointly with the City of Napa
- Publication of the quarterly newsletter "Pipeline", which always includes an article about pollution prevention
- Pollution prevention information distributed at Napa Valley College Job Fair
- Support and participation in California Coastal Cleanup Day
- Participation in Napa County Environmental Education Group and the Napa-Solano Regional Environmental Public Education Group
- Support and participation in BAPPG
- Participation in North Bay Source Control Committee

The District has recently reorganized its structure to devote more resources to its source control program. The District is divided into four groups that report to the general manager. They are Technical Services, Plant Operations, Collection System and Administrative Services. Previously, pollution prevention and pretreatment responsibilities were handled by the Laboratory Supervisor on a part time basis (i.e., <0.5 FTE). The Laboratory Supervisor reports to the Plant Manager. In the Spring 2002, the District approved, as a full time position, a Pollution Prevention and Source Control Officer, who reports to the Technical Services Manager. In addition, the District has contracted with Larry Walker Associates to provide assistance to the Pollution Prevention and Source Control Officer (P2SCO) that is equivalent to another 0.5 FTE. As part of this reorganization, the P2SCO developed a long-range source control plan, which was presented to the District's Board in July 2002. This presentation is attached.

The plan for the Pollution Prevention Program includes a commercial business element, a school outreach element, a public outreach element, and annual reporting and effectiveness measurement. The following activities are planned between 2002 and 2005:

2002/2003

- Implement commercial business program for automotive businesses and restaurants
- Conduct Vintage High P2 Audit project
- Update treatment facility tours

2003/2004

- Implement commercial business program for dental offices
- Work with Environmental Education Coalition of Napa County to develop Aquatic Outreach to Educators
- Obtain enviroscape diorama for use with 3rd and 4th grade classrooms

2004/2005

- Implement commercial business program for dry cleaners
- Conduct integrated pest management education programs as necessary
- Organize an Earth Day or Pollution Prevention Week poster contest for school kids
- Continue programs developed in 2002-2004

Summary

Based upon the above analysis, the District concludes that it is infeasible to meet the final effluent limitations proposed in the permit amendment. Furthermore, it may remain infeasible within a five-year time schedule to meet these limits. Alternatively, due to the lack of data for the current and future treatment process, the District requests that the Regional Board consider imposing monitoring requirements and the effluent limits contained in Table 4-3 of the Basin Plan for copper, cyanide, and mercury (assuming reasonable potential exists) in the interim while additional data is collected as authorized under the SIP. As described in this plan, however, the District will continue to conduct its current pollution prevention activities and work to implement planned programs for the future.

Attachment: NSD Pollution Prevention Power Point Presentation (July 2002)

Supplemental Information for Napa Sanitation District Infeasibility Study

As noted in the original Infeasibility Study, the NSD Pollution Prevention Program includes a commercial business element, a school outreach element, a public outreach element, and annual reporting and effectiveness measurement. The following activities are planned between 2002 and 2005:

2002/2003

- Implement commercial business program for automotive businesses and restaurants
- Conduct Vintage High P2 Audit project
- Update treatment facility tours

2003/2004

- Implement commercial business program for dental offices
- Work with Environmental Education Coalition of Napa County to develop Aquatic Outreach to Educators
- Obtain enviroscape diorama for use with 3rd and 4th grade classrooms

2004/2005

- Implement commercial business program for dry cleaners
- Conduct integrated pest management education programs as necessary
- Organize an Earth Day or Pollution Prevention Week poster contest for school kids
- Continue programs developed in 2002-2004

How these activities specifically address copper and mercury are discussed below.

Source identification tasks. Source identification is not specifically addressed above. However, Napa will be updating its industrial user survey in 2002/2003. As part of this effort, Napa will update its records regarding businesses that are typically considered sources of mercury and copper including medical facilities, dental offices, vehicle service facilities, and printers. Inspections and assessments of these facilities with respect to copper and mercury discharges will be conducted according to the schedule listed above. Some wastewater sampling will be conducted as part of the source identification effort. The P2 Audit to be conducted at the high school will also be used to assess schools as a potential source of copper and mercury. In addition, the District will continue to work with the City of Napa to assess the copper contribution from the water supply and corrosion.

Source reduction tasks. The source reduction tasks targeting copper and mercury sources described above include the vehicle service inspection program, the dental office inspection program, and the Vintage High School P2 Audit. In all three programs, BMP checklists will be used to determine if copper and mercury discharges are being managed properly. Businesses and the High School will be provided with a list of practices to implement to reduce mercury and copper discharges. Follow-up inspections will be conducted to determine rates of BMP implementation. BMP implementation rates will be used to measure the effectiveness of these efforts.

Public Outreach. Public outreach activities planned by the District include the Vintage High School Project, plant tours, articles in Pipeline (NSD's newsletter), participation in Environmental Education Coalition of Napa County and participation in local events including Coastal Cleanup Day, Napa Valley College Job Fair and Earth Day celebrations. The goal of these activities is to increase the public's awareness of local water pollution issues and NSD's role in protecting local waterways. Effectiveness of these programs in increasing awareness will be assessed using a short quiz to be administered after the plant tours and a short awareness survey to be included in the Pipeline.

Effectiveness Measurement. As noted for the source reduction tasks and the public outreach tasks, effectiveness measurement will be incorporated into these tasks. BMP implementation rates will be assessed using inspections conducted early in the program and as follow-up to assess the effectiveness of the vehicle service and dental programs mentioned above. BMP implementation rates may also be one measure that can be used for the High School project. Effectiveness of the public outreach programs in increasing awareness will be assessed using a short quiz to be administered after the plant tours and a short awareness survey to be included in the Pipeline.

Time Schedule. The schedule to initiate the above tasks is outlined below.

Task	Begin by:
Source Identification	
Update IU Survey	November 2002
Assess corrosion contribution	January 2004
Source Reduction	
Conduct initial vehicle service facility inspections	In progress
Conduct initial dental office inspections and outreach	September 2003
Conduct additional source reduction tasks identified by source identification as needed (e.g., medical facilities, corrosion sources)	June 2004
Public Outreach	
Update treatment facility tours	In progress
Support P2 Audit at Vintage High School	September 2002
Participate in and promote public events including Coastal Cleanup, Napa Valley College Job Fair, Earth Day events	Ongoing and conducted annually
Evaluate effectiveness	
Evaluate tours using quizzes	In progress
Conduct follow-up vehicle service facility inspections to assess	January 2003

compliance and evaluate effectiveness	
Conduct follow-up inspections at dental offices to assess BMP implementation and evaluate effectiveness	March 2003
Evaluate ongoing public outreach activities using survey in Pipeline	April 2003

Attachment H

Antidegradation Analysis for the Napa Sanitation District Water Recycling Facility August 23, 2002 and Supplemental Information, September 26, 2002

REPORT

Antidegradation Analysis for the Napa Sanitation District Water Recycling Facility

Napa Sanitation District
Napa, California

August 2002

TABLE OF CONTENTS

Section **Page**

LIST OF TABLES

LIST OF FIGURES

1 Introduction

The Napa Sanitation District, California, ("District") owns and operates a secondary municipal wastewater treatment facility ("facility") located at the Soscol Water Recycling Facility south of the City of Napa, Napa County. The facility has a dry weather design capacity of 15.4 million gallons per day (mgd). The water recycling facility, serving a current population of 70,000 people, collects wastewater from the City of Napa and adjacent unincorporated areas. Wastewater from the City of American Canyon serving a current population of 10,000 people is conveyed to the Discharger's wastewater treatment system. The City of American Canyon's new treatment plant is scheduled to start-up in late July 2002 and will discharge around mid September. When that plant is ready to discharge, the flow (estimated to be 1.0 mgd) will be disconnected from the District's wastewater treatment system.

The facility is classified as a major discharger and operates under the existing NPDES discharge permit No. CA0037575, Order No. 00-059. When this permit was adopted in July 2000, the secondary treatment process included four oxidation ponds operating in series. In 1992, the Discharger began to design and construct a conventional activated sludge system with an anaerobic sludge digester in addition to the oxidation pond system. This project also included new screens, aerated grit chambers, and primary clarifiers. In September 2001, the new systems were completed and put on-line. During the wet season (from November 1 through April 30), raw wastewater is treated using screens, aerated grit chambers, and primary clarifiers. After primary clarification, the flow is treated in the activated sludge system and/or the oxidation pond system. Up to 8 mgd of wastewater can be treated by the new activated sludge system followed by secondary clarification. The oxidation pond system consists of four oxidation ponds followed by polymer coagulation and clarification.

The Discharger is currently conducting a study to optimize treatment and effluent quality and minimize operating costs at the facility. Treatment scenarios being evaluated include full secondary treatment in the oxidation ponds, a combination of secondary treatment with some percentage of flow treated in the activated sludge process and the rest in the oxidation pond process, and full secondary treatment in the activated sludge process with peak wet season flows treated in the oxidation ponds. After secondary treatment, the oxidation pond system effluent is blended with the activated sludge effluent before undergoing chlorination and dechlorination, prior to discharge to the Napa River.

During the dry season (from May 1 through October 31), raw wastewater is treated in the same way as in the wet season. Secondary treatment scenarios being evaluated for the dry season are the same as for the wet season. After secondary treatment, the oxidation pond system effluent is blended with the activated sludge effluent, followed by coagulation, filtration and chlorination before reclamation. The flow not used for reclamation remains in the oxidation ponds and does not undergo polymer coagulation and clarification until the wet season begins when the discharge of the effluent into Napa River is allowed. The dry weather discharge to Napa River is generally prohibited, but with appropriate notification and justification to the Executive Officer of the Board, emergency discharge to Napa River may occur during this period. During years 1997-1999, the District reused an average of 25% of its annual average dry weather flow for irrigation of agricultural lands.

The facility's outfall is located in the Napa River, approximately 12 miles upstream from San Pablo Bay. Discharge to the Napa River is conveyed through a three-prong diffuser into deep water (160-feet from shore and 13.4-feet below the water surface). This discharger is classified as a deep-water discharger during the wet season and receives a dilution credit of 10:1. Owing to limited freshwater flows during the dry season, the Regional Board grants no dilution credit for dry season discharges.

1.1 Treatment Alteration

Effluent from the former facility was generally in compliance for all constituents and parameters of concern. However, it has been recognized[1] for over a decade that the facility's oxidation ponds were insufficient for controlling odors.

The District decided in 1992 to augment the existing facility with an activated sludge process. The activated sludge treatment process is commonly employed in the Bay Area (at least 12 Bay Area wastewater treatment facilities incorporate activated sludge processes). The new facility has been designed to handle combined commercial, industrial and domestic wastewater flows generated through build-out of the City of Napa's adopted General Plan. Approximately half of the influent is passed through the remaining oxidation ponds and half through the activated sludge process. Average flows for the new facility are quantitatively similar to the former facility's flows. River discharges will occur in general during the same time period as historical discharges.

1.2 Analysis Components

The analysis described in this report follows guidance provided by the Regional Board and the State Water Resources Control Board regarding the implementation of the antidegradation policy in NPDES permits.

The analysis considers the water quality impacts that the proposed discharge will have on the receiving waters: the Napa River and San Pablo Bay. It is assumed that compliance with the antidegradation policy for the larger San Francisco Bay would be less stringent and is, therefore, not addressed further here. The period of record for the data assessed is during months when river discharges regularly occurred, November 1997-April 2002. The key finding to be established is whether the new discharge will produce significant changes in the water quality of these receiving waters that would adversely impact beneficial uses. Specifically, the Antidegradation Analysis is based on an examination of the following:

1. Existing applicable water quality standards for the receiving waters.
2. Ambient conditions in the receiving waters in comparison to applicable water quality standards.
3. Incremental changes in constituent loadings resulting from the proposed change in discharge.
4. Comparison of the proposed increase in loadings relative to other sources.
5. An assessment of the significance of changes in receiving water quality.

[1] Air concerns were raised by local citizens and regulatory agencies

The constituents chosen for assessment of compliance with the antidegradation policy are copper, mercury, and cyanide. Effluent monitoring from the new facility indicates that the new process may not achieve the extraordinary removal rates for some constituents (primarily metals) previously achieved. Thus, there may be a reasonable potential for exceedances of California Toxics Rule (CTR) criteria, if applicable, or Basin Plan objectives in the receiving waters as set forth in the State Implementation Policy (SIP).

The constituents assessed represent the worst-case potential for degradation based on detected data. Based on that point, it is assumed that the analysis based on copper, mercury, and cyanide is representative of the effluent's compliance with the antidegradation policy. Overall, activated sludge is the best available technology for Bay Area dischargers and has been incorporated into the treatment process to improve effluent water quality. All other constituents and parameters with limitations in the CTR or Basin Plan are of less concern for this discharge than these three constituents.

2 Regulatory Requirements

Antidegradation policies have been issued at both the federal and state level. These policies are intended to protect existing high quality waters. In this section, the applicable policies and guidelines for implementation are described. The Regional Board plans to address whether the proposed increase in discharge limits is consistent with the antidegradation policy before granting the requested concentration increases.

2.1 Federal and State Antidegradation Policies

The federal antidegradation policy was adopted in its current form in 1983, and is found in 40 CFR §131.12. The federal policy requires that "water quality necessary to protect existing uses shall be maintained and protected". The text of the federal regulation is presented below:

(a) The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:

(1) Existing in-stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected

(2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for non-point source control.

(3) *Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.*

(4) *In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.*

The State antidegradation policy was adopted in 1968 as a resolution of the SWRCB (Resolution No. 68-16). The resolution is a statement of policy with respect to maintaining high quality waters in California. The state policy requires that changes in water quality will not unreasonably affect beneficial uses and will use the best practicable treatment control to maintain existing high quality. The full text of the state policy is provided below:

Whereas the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve the highest water quality consistent with maximum benefit to the people of the State and shall be controlled so as to promote the peace, health, safety and welfare of the people of the State; and

Whereas water quality control policies have been and are being adopted for waters of the State; and

Whereas the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of the Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature;

NOW, THEREFORE, BE IT RESOLVED:

1. *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

2. *Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.*

2.2 State Guidance on NPDES Permitting and Antidegradation

In 1987, USEPA Region 9 published *Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12*. That guidance document suggests that waters be classified as one of three tiers. Basic implementation procedures are described, along with a set of tasks for determining compliance with the Provisions.

In 1990, the SWRCB adopted an Administrative Procedures Update (APU 90-004), which specified guidance to the Regional Boards for implementing the state and federal antidegradation Policies and guidance. The guidance establishes a two-tiered process for addressing these policies. The process sets forth two levels of analysis: a simple analysis and a complete analysis.

A "simple" analysis may be employed where a Regional Board determines that:

1. A reduction in water quality will be spatially localized or limited with respect to the water body, e.g. confined to the mixing zone;
2. A reduction in water quality is temporally limited;
3. A proposed action will produce minor effects which will not result in a significant reduction of water quality; or
4. A proposed activity has been approved in a General Plan and has been adequately subjected to the environmental and economic analysis required in an Environmental Impact Report (EIR) required under the California Environmental Quality Act (CEQA).

Following the administrative procedures, a "complete" antidegradation analysis is not warranted if these considerations are deemed minor. The second tier of review is only necessary if the new facility's discharges would result in:

- A substantial increase in mass emissions of a constituent, or
- Significant mortality, growth impairment, or reproductive impairment of resident species.

Regional Boards are advised to apply stricter scrutiny to non-threshold constituents, i.e. carcinogens and other constituents that are deemed to present a risk of source magnitude at all non-zero concentrations. If the Regional Board does not find that the above determinations can be reached, a complete analysis is required, which involves a significant increase in level of analysis and burden of proof to demonstrate consistency with antidegradation policies.

This report constitutes a "simple" analysis, demonstrating that substantial load increases and significant effects to resident species are unlikely to occur. This format is chosen because it demonstrates that the proposed action will produce minor effects that will not result in a significant reduction of water quality. Furthermore, the proposed activity has been approved in a General Plan and is being adequately subjected to the environmental and economic analysis required in an EIR under CEQA.

2.3 Determining Objectives and Criteria

In this analysis, compliance with applicable water quality objectives and criteria is assessed to provide a benchmark of treatment performance and ambient conditions. Objectives for constituents of concern are based on total recoverable concentrations. For some constituents, different water quality objectives and criteria apply to saltwater and freshwater. The Napa River is fresh water (below 5 ppt salinity) during the discharge season, whereas San Pablo Bay is an estuarine water body with highly variable salinity (see Section 4), for which the lower of the freshwater and saltwater objectives apply.

In general, the most stringent applicable water quality standards are evaluated for compliance. In evaluating existing water quality conditions in the receiving waters, the Criteria Continuous Concentrations (CCC), where applicable, are applied, and the human health criteria are based on consumption of organisms only (not on consumption of water, because the Napa River downstream of the District's outfall is not a designated drinking water source). These criteria are most applicable because data collected in the receiving waters are typically indicative of conditions that persist longer over a longer term, and all stations monitored are seaward of drinking water intakes in the Bay-Delta.

3 Applicable Water Quality Objectives

Water quality criteria considered in this analysis come from the RWQCB Water Quality Control Plan (Basin Plan) and California Toxics Rule (CTR) water quality objectives, where applicable. Applicable limitations related to listings of impaired water bodies are also discussed.

3.1 Basin Plan Water Quality Objectives

The Basin Plan designates water quality objectives for the Napa River and San Pablo Bay, in addition to other waterways within the Regional Board's jurisdiction.

Where the discharge is above the zone of tidal influence and salinity is lower than 5 parts per thousand (ppt) at least 75% of the time in a normal water year, freshwater criteria apply. Where salinities exceed 5 ppt at least 75% of the time in a normal water year, saltwater criteria apply. When salinities are in between (estuarine conditions), the lower of the freshwater and saltwater criteria apply[2]. Under these definitions, the Napa River is fresh water (during the discharge period) and San Pablo Bay is estuarine. A hardness of 100 mg/L as $CaCO_3$ is used to compute copper limits, as assumed in the Regional Board's draft permit amendment's Reasonable Potential Analysis.

For the applicable mercury objective, compliance assessments are based on total recoverable concentrations. The criteria and effluent sampling results both are given as total recoverable concentrations.

Table 1~~1~~. Basin Plan numeric water quality objectives (WQO) for freshwater and saltwater. All units are µg/L and apply to total recoverable concentrations.

Pollutant	Freshwater		Saltwater	
	CCC(1)	CMC(2)	CCC	CMC
Cyanide	5.2	22.0	--	5.0
Copper(3)	11.8	17.7	--	--
Mercury	0.025	2.4	0.025	2.1

[2] See Basin Plan at 4-13.

(1) Criteria Continuous Concentration
(2) Criteria Maximum Concentration.
(3) A hardness of 100 mg/L as CaCO3 was used to estimate freshwater concentrations. A translator for copper of 0.42 is used to convert dissolved Basin Plan *chronic* WQOs to total recoverable WQOs. A translator for copper of 0.57 is used to convert dissolved Basin Plan *acute* WQOs to total recoverable WQOs. These values are based on the District's *Copper Translator Study Progress Report* (dated June 28, 2002) for wet weather conditions (there are separate translators for dry weather conditions).

3.2 California Toxics Rule Water Quality Criteria

The CTR lists water quality criteria for natural surface waters in the State, but have been promulgated to apply outside of the Bay Area[3]. For copper, the Basin Plan does not contain saltwater criteria for copper; therefore, the Regional Board contends that the CTR value applies in that case. The District does not agree with this contention, but will provide an analysis using these numbers as requested by the Regional Board.

In its May 1995 National Toxics Rule revisions, USEPA recommended that states base aquatic life objectives for metals on dissolved measurements. For the assessment of water quality conditions in San Pablo Bay, receiving water criteria as dissolved concentrations are converted to total recoverable concentrations (as measured in effluent and in San Pablo Bay) using the copper Translator Study's most recent data for converting dissolved concentrations into total recoverable concentrations. A translator for copper of 0.42 is used to convert dissolved Basin Plan *chronic* WQOs to total recoverable WQOs. A translator for copper of 0.57 is used to convert dissolved Basin Plan *acute* WQOs to total recoverable WQOs. These values are based on the District's *Copper Translator Study Progress Report* (dated June 28, 2002) for wet weather conditions (there are separate translators for dry weather conditions).

CTR water quality criteria are as follows:

Chronic (four-day continuous concentration)

4.8 ug/L dissolved / 0.42 translator = 7.4 ug/L

Acute (maximum concentration)

3.1 ug/L dissolved / 0.57 translator = 8.4 ug/L

Because these values are lower than the freshwater objectives given in the Basin Plan, they apply to San Pablo Bay measurements.

3.3 Beneficial Uses and TMDLs

The beneficial uses for the Napa River downstream of the District's outfall are identified in the Basin Plan as shown in Table 2.

[3] See 40 CFR §131.38(b)(1)(note b)(criteria apply to California waters except for those waters subject to the San Francisco Bay Region's Basin Plan, wherein the Basin Plan still applies).

Table 22. Beneficial uses of the Napa River downstream of the District's outfall.

Beneficial Use	Description
Cold freshwater habitat (COLD)	Uses of water that support cold water ecosystems, including, but not limited to, preservation, or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Fish migration (MIGR)	Uses of water that support habitat for aquatic organisms that are temporary inhabitants, including anadromous fish. Maintenance of zones of passage free from physical or chemical barriers is important to this use.
Navigation (NAV)	Uses of water for shipping or transport by private, military or commercial vessels.
Preservation of rare and endangered species (RARE)	Uses of waters that support habitat for rare or endangered plant and animal species.
Water contact recreation (REC-1)	Uses involving body contact with water, where ingestion of water is reasonably possible, including swimming, wading, water skiing, windsurfing and diving.
Non-contact water recreation (REC-2)	Uses involving proximity to water, not normally including water contact, including picnicking, sunbathing, hiking, beachcombing, camping, boating, sightseeing and nature studies.
Fish spawning (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
Warm freshwater habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Wildlife habitat (WILD)	Uses of waters that support wildlife habitat, including preservation of vegetation, prey species and water quality.

The Clean Water Act section 303(d) addresses waters that are not expected to meet water quality standards necessary to maintain designated beneficial uses after application of technology-based requirements by point sources. States are required to develop total maximum daily loads (TMDLs) for them, with oversight from USEPA. A TMDL is the amount of loading of a constituent from all sources that a water body can receive and still meet water quality standards. With TMDLs, the Antidegradation Analysis is a moot point, because mass load limits under a TMDL are set to attain standards, independently from antidegradation considerations.

Copper TMDL investigation started in South Bay have brought the 303(d) listing of copper into question. A technical study report has recently been submitted for the remainder of the Bay to address copper impairment. The Regional Board has proposed to remove copper from the 303(d) list based on these findings. Revised criteria may result from these studies, which, if the current evidence were representative, would be less stringent than the CTR standards. In the interim, the effluent copper levels could be compared to the prescribed limits in Basin Plan Table 4-3, which sets copper for shallow water discharges at 20.0 ug/L.

A draft TMDL for mercury in the Bay has been completed by the Regional Board and submitted to USEPA Region IX in June 2000. Adoption of the final TMDL for mercury for the Bay is expected to occur by late 2002. In its current form, wastewater dischargers are shown to represent a minor source. The waste load allocation for wastewater dischargers calls for deep-water dischargers to maintain effluent total mercury concentrations below 0.025 ug/L and for shallow water dischargers to maintain effluent total mercury concentrations below 0.015 ug/L (however, this is not currently an applicable water quality standard). Maintaining those concentration limits and *doubling* effluent flow rates would not result in a significant improvement in water quality. For the

District in particular, the proposed load allocation is 0.7 kg/year, far greater than the District's current mass limit of 0.324 kg/yr (0.027 kg/mo x 12 mo.)[4].

4 Environmental Setting

The District's discharge outfall, major waterway features, and Regional Monitoring Program (RMP) monitoring stations are shown on Figure 1.

4.1 Receiving Water Conditions

The District contributes funds to support the RMP, which monitors water quality at the mouth of the Napa River and in central San Pablo Bay. Ambient concentrations of metals and organic compounds in the Napa River in the vicinity of the District's outfall, however, were not measured routinely until earlier this year, in compliance with a letter requesting such monitoring from the Regional Board (referred to as the "13267 letter").

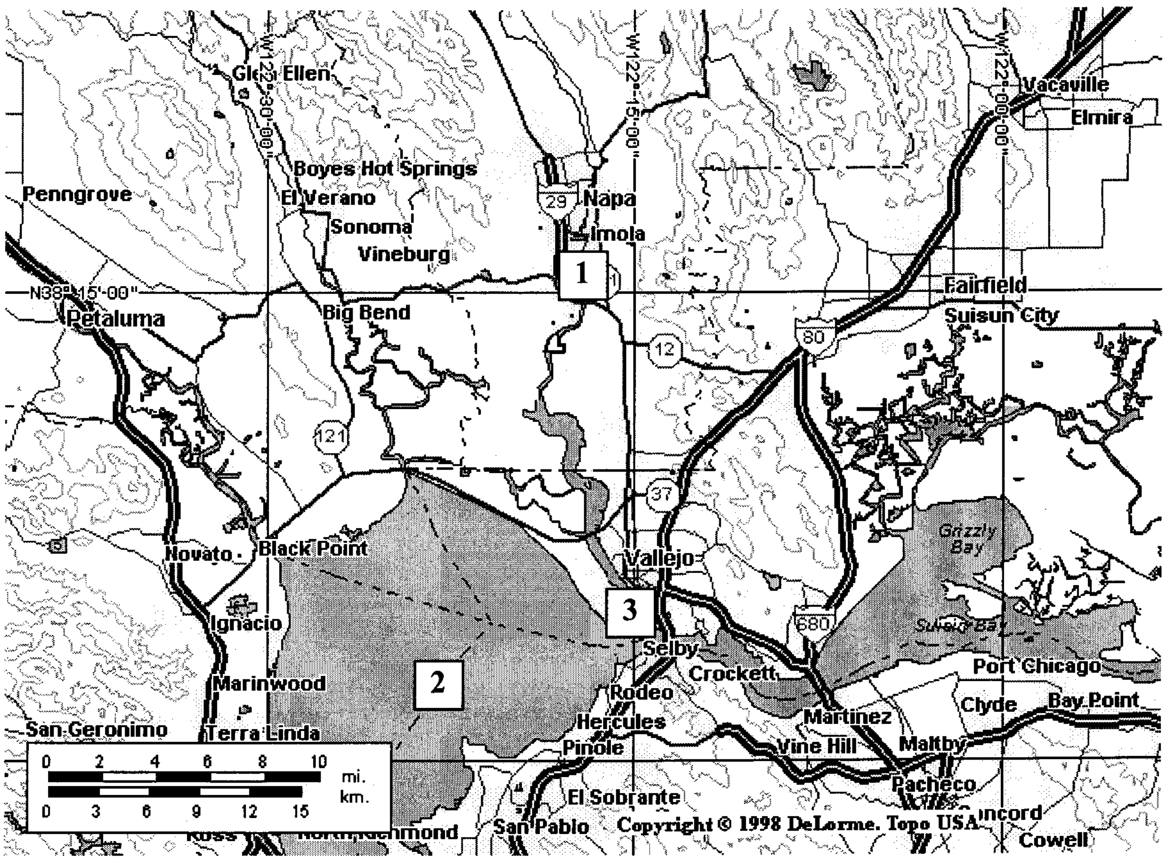


Figure 1~~1~~. The Napa River reach and San Pablo Bay, showing (1) District's outfall, (2) Regional Monitoring Program (RMP) station BD20, and (3) RMP station BD50.

[4] See Order No. 00-059 at Table 5.

4.1.1 Regional Water Quality

Water quality conditions throughout the Bay are monitored as part of the RMP. Two stations are of interest for this analysis: BD50 (mouth of the Napa River) and BD20 (central San Pablo Bay). The RMP is an on-going program initiated at full scale in 1993. The program monitors contaminant concentrations in water, sediments, and fish and shellfish tissue in the Bay and Delta.[5] For each constituent, 14 wet season samples (approximately two per season for years 1993-2000) for both stations have been published. Here, only wet season data (excluding once-per-year summertime samples) are assessed, consistent with the discharge period. Two sampling stations contain useful data for this study: Napa River (at the river mouth – Station BD50) and San Pablo Bay (approximately in the center of San Pablo Bay – Station BD20). A summary of the data is given in Table 3. There are no regional data available at this time for cyanide concentrations in the Napa River or San Pablo Bay.

The median concentrations for both copper and mercury are below their lowest applicable WQOs. Because samples were collected less frequently than four-day periods, even maximum values are compared to chronic criteria. These chronic criteria, based on EPA 304(a) criteria guidance, are set anticipating one exceedance every three years without adverse effect. Over the eight-year monitoring period (wet season only), copper and mercury measured at the San Pablo Bay station exceeded the lowest applicable WQOs three (once in 2.6 years) and four times (once in two years), respectively. At the Napa River station (also a saltwater environment at the River mouth), concentrations for both copper and mercury exceeded the lowest applicable WQOs four times (once in two years).

Table 3~~3~~. RMP wet season data summary for total recoverable mercury and copper concentrations at two sample stations (1993-2000). Units are µg/L.

Constituent	San Pablo Bay (BD20)				Napa River (BD50)			
	n	Min	Max	Median	n	Min	Max	Median
Copper (TR)	13	2.2	***14.3***	4.2	13	0.6	***14.4***	5.7
Mercury (TR)	11	0.0039	***0.0881***	0.0096	11	0.008	***0.0708***	0.0169

Bolded, italicized values exceeded minimum WQOs given in Section 3.

4.1.2 Napa River Receiving Water Quality

Water samples have been collected at seven locations in the Napa River as part of the copper Translator Study[6] during the recent period December 2001 – April 2002. Copper concentrations averaged 5.4 µg/L (total) and 2.2 µg/L (dissolved) during this sampling period (average of all sample sites, for all wet-season sampling events). The maximum total recoverable concentration measured was 7.2 ug/L. No readings exceeded the lowest applicable WQO of 11.8 ug/L (Basin Plan CCC objective).

There are no similar data available at this time for mercury or cyanide concentrations in the Napa River in the vicinity of the District's outfall.

[5] Data are available at the RMP web site (http://www.sfei.org/rmp/rmpwater.htm).
[6] This study is on-going.

4.2 Current Effluent Water Quality

Monthly effluent self-monitoring data for constituents of concern are summarized here, to compare the former facility with the current facility. Data for effluent copper, mercury, and cyanide are shown in Figure 2, showing the former facility's effluent median concentrations (1997-2000 wet season discharge periods' data) and monthly sampling results for the recent discharge season when the activated sludge process was operating[7]. The "X" symbols in the figure for cyanide indicate non-detected values at those detection limits. Statistical summary values for effluent are given in Table 4. The relative effects on the receiving waters from these changes are discussed in Section 5.

The calculations for mass loads are hindered by the fact that at least half of the data are non-detected values. Because of this condition, the median is computed as the average between a detected value and a non-detected value. Maximum concentrations for these three constituents all exceeded the lowest applicable WQO, which explains why they were considered to have Reasonable Potential.

Effluent cyanide appears to have increased in the new facility, compared to the former facility's operation. Only total cyanide is measured, whereas free cyanide (the toxic fraction) is not. Based on the median effluent cyanide concentration, the District's annual mass load has increased by approximately 60 percent.

Effluent copper concentrations in wet season effluent have increased since the activated sludge process began operation. Performance is generally below the chronic WQO (exceeded once), and never exceeded the acute WQO. Based on the median effluent copper concentration, the District's annual mass load has approximately doubled.

Effluent mercury concentrations appear lower than the former facility's effluent in part because of the recent use of ultra-clean sampling and analytical techniques. One sample, in February 2002, exceeded the chronic WQO. This value is 30 times higher than average effluent concentrations and does not represent normal operating conditions. This value is still more than an order of magnitude below the acute WQO. No other samples have exceeded the chronic WQO. Based on the median effluent mercury concentration, the District's annual mass load has decreased.

[7] Multiple samples from any given month (sampling was more frequent during the first two months of operation of the activated sludge process) are averaged to obtain monthly values.

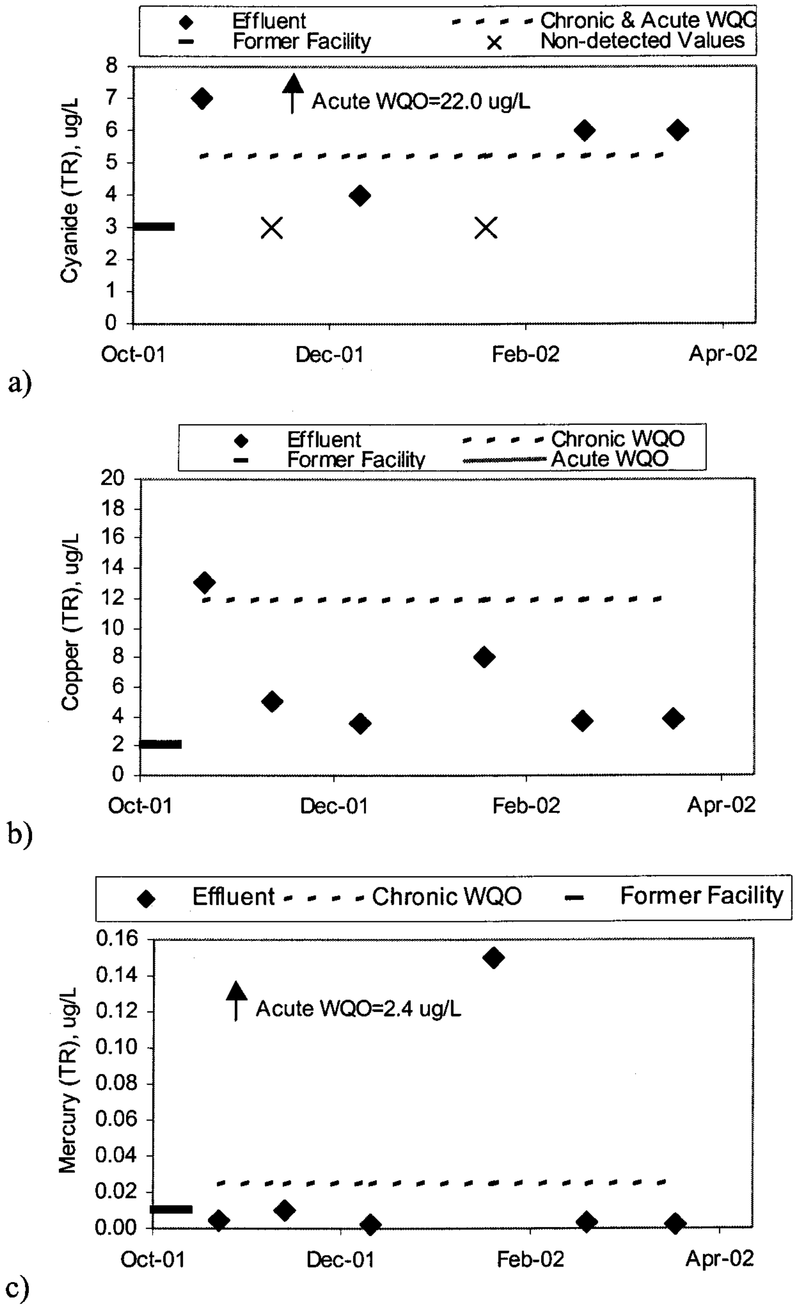


Figure 22. Effluent water quality data for the former facility (median values for 1997-1999 river discharge periods) and current facility (monthly average values) compared to the lowest applicable chronic and acute WQOs for a) cyanide, b) copper, and c) mercury. The "X" symbols in the figure for cyanide indicate non-detected values at those detection limits.

Table 4~~4~~. Summary statistics of monthly averages for constituents of concern in the District's river-discharged effluent for pre-activated sludge (November-April, years 1997-1999) and post-activated sludge (November 2001 – April 2002).

Pollutant	n	Min or Reporting Limit (µg/L)	Maximum (µg/L)	Median (µg/L)	Mass Load (10^3 kg/yr)
Former Facility					
Cyanide	43	<3	4	<3	<0.032
Copper	43	<2	4	<2	<0.021
Mercury	43	<0.01	0.02	<0.01	<0.0001
Current Facility					
Cyanide	6	<3.0	***7.0***	<5.0	<0.053
Copper	6	3.6	***13.0***	4.4	0.05
Mercury	6	0.0026	***0.15***	0.004	0.00004

Bold, italicized values exceeded their respective minimum WQOs given in Section 3; comparing minimum and median values to chronic WQOs and maximum values to acute WQOs.

4.3 Other Sources of Constituents of Concern to the Napa River and San Pablo Bay

As part of RMP efforts, Davis et al. (2001) estimate annual loads to the Bay from sources of selected constituents of concern. The constituents addressed in that report include mercury and copper, among others. Sources evaluated for both of these constituents included publicly-owned treatment works (POTW) and industrial discharges, urban runoff, atmospheric deposition, rivers, in-bay cycling (e.g., sediment re-suspension), vessels, and dredging.

Mercury sources were also investigated and quantified as part of the San Francisco Bay draft mercury TMDL (SF RWQCB, 2000). Sources of mercury identified include POTW and industrial discharges, direct atmospheric deposition, rivers, within Bay sources (background load, urban runoff, Guadalupe River watershed), and sediment remobilization. Loadings from each of these sources were determined for various segments of the Bay (lower South Bay, South Bay, Central Bay, San Pablo Bay, and Suisun Bay). Available loading estimates to San Pablo Bay for constituents of concern are presented in Table 5.

Table 5~~5~~. Mass balance summaries (10^3 kg/yr) for copper and mercury in San Pablo Bay.

Metal	POTW/ Industrial Discharges	Benthic Remobil-ization	Atmos-pheric Inputs	Central Valley River Inputs	Bay Area River Inputs	Total
Copper	3	129	2	46	(1)	180
Mercury	0.011	0.25	0.002	0.61	0.025	0.90

Sources: SF RWQCB (2000) for mercury, and Rivera-Duarte and Flegal (1997) for copper.
(1) Included in estimate of Bay Area river inputs.

4.3.1 POTW and Industrial Discharges

Beginning in the 1950s and continuing into the 1980s, municipalities and industries discharging wastewater to the Bay have constructed secondary and advanced secondary treatment plants. In addition, municipalities implemented industrial pretreatment programs in the 1970s and 1980s and have implemented pollution prevention programs for specific toxic constituents in the 1990s. The net effect of these treatment, pretreatment and pollution prevention programs has been a significant decrease in loadings of essentially all constituents from municipal and industrial sources. For example, loadings of biodegradable organics and suspended solids from municipal treatment plants have decreased by over 75% since 1955 (Condit, 1987). Significant reductions in municipal and industrial loadings of trace elements and trace organics have also occurred. The result of these reductions is that municipal and industrial loadings generally comprise a small percentage of the total loadings of constituents of concern to the Bay-Delta and that conventional constituents are no longer considered to present problems in the Bay (historically such problems included low dissolved oxygen, odors, and floating material).

An evaluation of POTW metals loads to the Bay was performed as a part of this study. Results of this analysis are presented in Table 6. Average concentrations of metals in effluent were calculated from the most recently available NPDES monitoring data. Average annual loads were estimated as the product of reported average discharge flow rates and effluent concentration for each metal (using appropriate unit conversions, etc.), as cited in the most recently available draft or final NPDES permits. Note that the total loads (in kg/year) do not equal the total loads (in 10^3 kg/yr) estimated by others, as given in Table 5. The range in values indicates the variability in the estimates presented.

Table 66. Estimated copper and mercury loads to San Pablo Bay from POTWs.

Municipal Dischargers	Average Annual Loads		
	Avg. Flow, mgd	Copper, kg/yr	Mercury, kg/yr
City of Benicia	2.3	23.2	0.07
City of Calistoga(1)	0.63	4.1	0.01
Central Contra Costa SD	43.1	334.7	2.15
Cities of Hercules/Pinole/Rodeo	2.4	16.6	0.02
Las Gallinas Valley SD(1)	2.2	14.0	0.03
Napa SD(1)	***15.4***	***40***	***0.05***
Novato SD(1)	5.4	33.7	0.07
City of Petaluma(1)	5.2	27.9	0.07
Sonoma Valley Co. SD(1)	2.6	33.1	0.08
Vallejo San. & Flood Control	11.4	317.8	0.77
Town of Yountville	0.24	3.1	0.00
Total Flows and Loads	***90.9***	***848***	***3.31***

(1) These facilities reclaim wastewater in summer. Bay mass loading estimates presented in this section have been adjusted accordingly.
Shaded cells indicate no data are available. Values shown are computed from the average concentration values for the other facilities.

4.3.2 Urban Runoff Inputs

Urban runoff from small tributaries (including storm drains) has been identified as a potentially significant source of some constituents to the Bay. These tributaries convey constituents deposited and washed off in the watershed as well as constituents from other sources. All other factors being equal, watersheds with more soil erosion will tend to contribute more metals to the Bay.

Potential sources of mercury to urban stormwater include improperly disposed paints, thermometers, caustic soda, dental fillings, contact lens solutions, and fluorescent lights. The total mercury entering the Bay from small tributaries, primarily draining urban areas, is estimated to be 58-278 kg/yr (SF RWQCB, 2000). The wide range of this estimate indicates the need for more data to quantify this loading term. There is also no information on the species of mercury entering the Bay from urban areas.

Urban runoff is also a common source of copper. Copper is ubiquitous in the urban environment, present in background sources (rainfall, tap water, soil, vegetation) as well as several human-generated sources such as paint; solar cells; pesticides; automobile brakes, tires and emissions; concrete; and metal products. In Santa Clara Valley, 83% of the average annual load of copper in stormwater runoff came from residential/ commercial areas (Woodward-Clyde Consultants, 1992). However, the monitoring data did not indicate any direct correlation with particular land uses, implying that multiple or watershed-wide sources are prevalent.

4.3.3 Atmospheric Inputs

Constituents in the air may be directly deposited to the Bay surface or may reach the Bay indirectly via runoff from surrounding land areas. No systematic studies have been conducted to evaluate the magnitude of air deposition and its relative significance of contribution to the total constituent loading to the Bay. Some preliminary evaluations have been conducted that provide an indication of the potential significance of both direct and indirect atmospheric deposition as pathways for mercury and copper.

An atmospheric deposition Pilot Study is being conducted under the RMP to begin to quantify this important pathway of constituents to the Bay. The first phase of the Pilot Study focused on the trace element component (specifically copper, mercury, and nickel. Sample collection began in April 1999 and was conducted every 14 days through July 2000. It was estimated that direct atmospheric deposition contributes 27 kg/yr and indirect atmospheric deposition may contribute another 55 kg/yr of total mercury to the Bay. Results from this study for copper are not yet available to the public. However, preliminary findings indicate that atmospheric deposition accounts for less than two percent of the total load for copper.

Atmospheric deposition sources of mercury were also evaluated in the Draft TMDL for Mercury (SF RWQCB, 2000). Estimates suggested that direct atmospheric deposition to the Bay accounts for 1-3 kg/yr of mercury, which is less than one percent of the total load.

4.3.4 Riverine Inputs

Sacramento and San Joaquin Rivers are important sources of metals to the Bay. Sources of metals from these upland watersheds include all of the other source categories to the Bay (urban runoff, permitted dischargers, atmospheric deposition), plus potentially greater sources such as soil erosion, mining activity, and geothermal springs. As indicated in Table 5, riverine inputs are the second largest source of copper and the largest source of mercury to the Bay.

4.3.5 In-Bay Cycling

Sediment remobilization has been identified as a significant source of some constituents to the Bay. Historic mining activities during the hydraulic mining era of the 1800s contributed over one billion cubic yards of sediment to the northern portion of the Bay. Over time, the deposited sediment is slowly being re-exposed through sediment remobilization (scour, suspension, re-deposition), resulting in a net input of copper, mercury, and other constituents. These physical disturbances are caused by both natural phenomena (wind, tides, inflows, aquatic life activity) and human activities (such as dredging and barge traffic).

Biological cycling of metals and other constituents is primarily a process mediated by phytoplankton. During algae blooms, large amounts of dissolved nutrients (including metals) may be incorporated into organic matter. As the algae decompose, constituents are mineralized back to inorganic forms. Benthic re-mobilization of sediments may also contribute to dissolved constituent fluxes if coupled with desorption.

5 Assessment of Water Quality Impacts

In this section, the significance of constituent mass loadings and concentration changes related to the District's treatment process change is assessed for the Napa River and San

Pablo Bay. This analysis pertains to the permitted river discharge period (wet season) only.

5.1 Incremental Impacts on Mass Loadings

Mass loading estimates are computed to put the effect of the District's increased discharge concentrations of copper, mercury, and cyanide in context with total mass loadings or ambient receiving water conditions. Assuming that the facility discharges wastewater of a reasonably typical quality, the relative contribution of the metals assessed here would be representative of the relative contribution of other constituents.

The effluent flow rate used for the mass load estimates is 15.4 mgd over a river discharge period of 183 days. Median effluent constituent concentrations over the past season of river discharges are used for constituents assessed in the mass loading calculations.

Copper and mercury loadings to San Pablo Bay were presented in Section 4. These loadings were used to assess the incremental loadings increases to San Pablo Bay from the facility's altered discharges. Percent contributions of municipal dischargers and the facility to total annual mass loading to San Pablo Bay are presented in Table 8.

Table 7~~7~~. Percent of estimated total annual mass loads to San Pablo Bay contributed by municipal discharges and the District.

Constituent	% from all Municipal Dischargers	Percent from Napa Previously	Percent from Napa Currently
Copper	1.42%	0.012%	0.022%
Mercury	1.23%	<0.012%	0.006%

Municipal dischargers are estimated to contribute a small percentage of the total mass loads of copper and mercury to San Pablo Bay. As shown in Table 7, the increase in the District's discharged concentrations results in a potential increase of approximately 0.01% in their contribution to San Pablo Bay's total annual mass loading of copper.

Partially because of the improved analytical techniques, the median value for total mercury concentrations is lower for the current facility compared to the former facility. Based on the median values, the facility's mass load contribution of mercury appears to have decreased by 0.006%.

5.2 Incremental Impacts on Water Quality

Routine and supplemental monitoring data for the receiving waters and effluent were described in Section 4. Based on these sources of information, the extent of the incremental effect on ambient water quality of increased discharge of constituents of concern from the facility is discussed here.

The discussion for cyanide is unique to that compound. Other conventional constituents and parameters in the current facility's effluent are not dissimilar to the former facility's effluent. Odor problems, the root cause for the process change, have greatly improved since the new facility came on-line.

The discussion for copper is assumed to be representative of other metals, which have similar physico-chemical properties. Because the concern is greatest for copper (based on the Reasonable Potential Analysis performed by Regional Board staff), the impacts from other metals is expected to be less than that presented here.

The discussion for mercury is assumed to be representative of other bioaccumulative compounds. Mercury represents the worst-case scenario because of the one exceedance of its WQO (no other bioaccumulative compounds have exceeded their WQOs).

5.2.1 Cyanide

Cyanide has been detected in 4 of 6 effluent samples since the activated sludge process began discharging to the Napa River. The District's effluent cyanide concentrations are similar to that found for other Bay Area dischargers.

The applicable criteria for cyanide are an unresolved issue. The values, intended to protect against toxic effects to aquatic organisms, are based on laboratory-condition tests using free cyanide. Cyanide is rarely detected in San Francisco Bay.

The Water Environment Research Foundation (WERF) is researching treatment operations as well as the analytical techniques for measuring cyanide, because most treatment facilities (including Napa's) appear to discharge at greater concentrations than their effluent. The WERF report[8] was due in late 2001 but has not yet been published. A report of ambient concentrations in the Bay is due in May 2003, followed by a proposed site-specific objective due in June 2003. The District is participating in these efforts.

Because of the limited concern for toxic effects of cyanide in the receiving waters, no basin-wide estimates of mass loads have been made.

5.2.2 Copper

San Pablo Bay is currently on the State's 303(d) list for copper. The minimum total copper WQOs in the Napa River near the District's outfall are 11.8 μg/L (chronic) and 17.7 μg/L (acute), accounting for translator effects. The effluent's median total recoverable copper concentration during river discharge periods has increased from <2 μg/L for the former facility (1997-1999 data) to 4.4 μg/L for the current facility (2001-2002 data). Effluent copper concentrations from the facility once exceeded the chronic WQO since the current facility began discharging to the Napa River in November 2001.

Total recoverable copper concentrations measured at seven stations in the Napa River sampled for the Translator Study averaged 5.36 μg/L, 22% higher than the median river-discharged effluent concentrations. Total recoverable copper concentrations measured at the mouth of the Napa River (RMP Station BD50) had a median value of 5.74 μg/L, 30% higher than river-discharged effluent concentrations. Thus, the effluent generally dilutes copper concentrations in the Napa River and is below Basin Plan water quality objectives.

The mass load of total recoverable copper from the District's effluent appears to have approximately doubled for the new facility, based on the fact that discharged

[8] The study is titled "Cyanide Formation and Fate in Complex Effluents and its Relation to Water Quality Criteria".

concentrations have increased. However, the load increase represents an increase of only 0.01% change in its contribution to San Pablo Bay.

5.2.3 Mercury

San Pablo Bay is on the State's 303(d) list for mercury. Observed effluent mercury concentrations have decreased from a median value of <0.01 μg/L to 0.004 μg/L. The comparison between past and current mercury concentrations is hindered by the fact that the District began using ultra-clean sampling and analytical techniques in June 1999. Since the new facility began discharging to the Napa River in November 2001, the measured concentration of mercury in discharged effluent has exceeded the WQO of 0.025 μg/L on one occasion, and this appears to have been an aberration.

Total recoverable mercury concentrations measured at the mouth of the Napa River (RMP Station BD50) had a median value of 0.0096 μg/L, approximately double effluent concentrations. Thus, effluent appears to dilute the receiving water for mercury.

Mercury in water is of concern for bioaccumulative effects. As such, the mass load contribution is an important aspect. The mass load contribution has potentially decreased from <0.012% to 0.006% of the total load estimate to San Pablo Bay.

6 Evaluation of Consistency with Antidegradation Policy

6.1 Basis for Findings

The impact of the increased facility discharge has been evaluated by 1) examining the magnitude of increase in mass loadings of specific constituents in comparison to other Bay loadings and 2) examining the change in ambient water quality that will result for selected constituents.

Section 5 summarizes available information about the relative concentrations of copper, mercury, and cyanide in the District's effluent, and the magnitude of the proposed facility's increase on total loadings of these constituents to San Pablo Bay. These results have been used to estimate comprehensive water quality impacts of the process change.

6.2 Issues Related to 303(d)-Listed Constituents

A debate currently exists as to whether federal and state laws and regulations allow projects to add mass loadings of 303(d)-listed constituents to a listed water body. Recent staff determinations by the Regional Board and USEPA have held that such increased loadings are not allowable until a TMDL has been completed for the listed constituent. The argument for this position is that *any increase* in mass loadings *contributes to* violations of water quality objectives and that the Bay has no capacity to assimilate *any* additional mass loadings of 303(d)-listed constituents. It is inferred that water quality objectives are currently exceeded, since such exceedances are prerequisites for 303(d) listing. It is also inferred that no "assimilative capacity" exists, on the strength of the listing itself. Based on this interpretation of existing regulations (40 CFR 122.44(d)), the

Regional Board has issued NPDES permits which impose current performance-based mass limits on 303(d)-listed constituents.

Staff has cited the antidegradation policy as one reason for this determination. Under the federal antidegradation policy, "existing in-stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." It is argued that, where uses are deemed to be impaired through the 303(d) listing process, the level of water quality necessary to protect existing uses is not being attained. It is therefore argued that any additional loading would interfere with the required improvement in water quality. The staff interpretation is that such an increase in mass loading would not be consistent with the antidegradation policy.

There are several counter arguments to the above positions and interpretations. In each counter argument cited below, the key issue involves the magnitude of water quality impact associated with the proposed increase in loading.

In the 1992 case of Oklahoma v Arkansas, the US Supreme Court found that the Clean Water Act and supporting regulations do not require that a new discharge to 303(d)-listed waters be prohibited. This case found that new discharges are not judged to contribute to water quality objective violations unless a measurable water quality impact would result. The Supreme Court held that no provision in the Clean Water Act or supporting regulations existed which would preclude the new discharge. By extension, this argument can be extended to the case of expanded discharges, which would increase mass loadings to a 303(d)-listed water. By inference, no provisions in law or regulation exist which would preclude such increases.

Under the TMDL program, a holistic load reduction plan is developed which will result in the attainment of water quality standards. Is it understood that this plan may allow increases in loadings from some sources, as long as the total loading is reduced. This circumstance is likely to be encountered, where the prevention of increase in some minor sources will be largely unavoidable or prohibitively expensive whereas reductions in other sources may be cost effective, by comparison. Therefore, it is not a foregone conclusion that increases in some existing discharges, or new discharges, may not be allowed in 303(d)-listed waters as the result of TMDL determinations.

The mercury TMDL report prepared by the Regional Board makes this point. The report finds that the doubling of existing loadings from POTWs (or, on the other extreme, complete removal of current loadings from POTWs) would not measurably impact mercury levels in fish in the Bay. This document focuses on efforts to control large, previously uncontrolled sources of mercury input to the environment.

Once the TMDL and load allocation is complete and approved, every NPDES permit in the listed water body must be consistent with the TMDL. In such cases, prior actions by the Regional Board to allow increases in permitted capacity to dischargers will not preclude the Board's ability to limit mass loadings of 303(d)-listed constituents in accordance with an approved TMDL and wasteload allocation. As such, the TMDL itself, rather than the antidegradation policy, is the appropriate vehicle under the Clean Water Act to sort out whether mass loading limits are needed for 303(d)-listed constituents.

At the State of California level, the Porter-Cologne Act states that the quality of waters of the state shall be regulated to attain the highest quality reasonable. Where an increased discharge to serve planned community growth and housing would not result in a significant change in ambient water quality, it can be argued that such an increase is reasonable. Under Porter-Cologne, Section 13241, "it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses." Such provisions are clearly applicable in cases where small increases from minor sources result in immeasurable or relatively minor changes in water quality. The permitting guidance issued by the SWRCB in 1990 addresses these cases and provides guidance to Regional Boards that such increases are consistent with the purpose and intent of the antidegradation policy. These provisions and interpretations of the Porter-Cologne Act apply equally to 303(d)-listed waters and unlisted waters.

NPDES permits in the Bay region have been written to limit mass loadings of bioaccumulative 303(d)-listed constituents to existing loadings. In such cases, increases in permitted capacity would have no legal or practical consequence regarding the 303(d)-listed constituent in question. With allowable mass loadings capped at existing levels, the linkage between permitted capacity and mass loadings is broken. Therefore, the antidegradation analysis, which is keyed to increases in permitted capacity, would not need to address those constituents for which a mass cap (which would be less than the mass loading at permitted capacity) is established in the permit. In effect, the finding of the antidegradation analysis for those constituents would be "no water quality change".

The conclusion derived from the above analysis is that the determination of consistency with the antidegradation policy is not impacted by 303(d) listings or the legal interpretations arising from those listings. If, on the one hand, 303(d) listings lead to immediate mass limits on specific constituents in NPDES permits, then concerns regarding mass increases under antidegradation will be alleviated. If, on the other hand, immediate mass limits are not required, the TMDL process will lead to appropriate conclusions regarding ultimate mass limits, independent of antidegradation concerns. In the interim, an antidegradation analysis, performed in accordance with the guidance described in State Water Resources Control Board's Administrative Procedures Update Number 90-04, will provide a process to address antidegradation issues for all discharge constituents.

6.3 Significance of Water Quality Changes and Findings

Primary findings in this analysis are that the loadings of constituents in the District's discharge associated with the facility's process change produce minor effects that are not significant. The source loading tables indicate that the mass load of copper to San Pablo Bay increases by 0.01% for the new facility. Similar magnitudes can be expected for other metals. For other constituents, the mass load to the receiving waters is likely to decrease with the improved treatment process.

Based on these quantitative results and qualitative discussion, it is concluded that the impact of the proposed increase will not have a measurable impact on ambient levels (water, sediment or biota) of any constituents contained in the facility's discharge. Direct estimates of changes in constituent concentrations in surface sediments or biota were not performed, due to the complexity and uncertainty involved in such an analysis. As a result, in this analysis, such changes in sediment and tissue concentrations can only be inferred from the water column results.

Further, the process change – indeed, designed to improve effluent water quality – will not adversely impact beneficial uses of the Napa River and San Pablo Bay. As a result of the findings of this analysis, the proposed discharge is consistent with the purpose and intent of the federal and state antidegradation policies.

It must be reiterated that activated sludge is the best practicable technology for treating typical Bay Area wastewaters. Addition of this process was subjected to the environmental analyses in an environmental impact report. For the Napa Sanitation District, this new process augments the less effective oxidation ponds process for an overall improvement in water quality. The fact that monitoring data during the first year of operation indicates some inconsistencies in operation should not be construed to imply that the receiving waters will be degraded in any manner.

References

Condit, R.J. (1987). Municipal Division Activities Report, Volume II. 6 pp.

Regional Monitoring Program (2000). *Contaminant Loads from Stormwater to Coastal Waters in the San Francisco Bay Region: Comparison to Other Pathways and Recommended Approach for Future Evaluation.* Prepared by J.A. Davis, L.J. McKee, J.E. Leatherbarrow, and T.H. Daum, September 2000.

Rivera Duarte, I. and A. R. Flegal (1997). "Porewater gradients and diffusive benthic fluxes of Co, Ni, Cu, Zn, and Cd in San Francisco Bay." *Croatica Chemica Acta.* 70(1):389-417.

San Francisco Bay Regional Water Quality Control Board (2000). *Watershed Management of Mercury in the San Francisco Bay Estuary: Draft Total Maximum Daily Load Report to U.S. EPA.* San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

Woodward-Clyde Consultants (1992). *Source Identification and Control Report.* Santa Clara Valley Nonpoint Source Pollution Control Program. December 1, 1992.

Antidegradation Analysis for the Napa Sanitation District Water Recycling Facility

Napa Sanitation District
Napa, California

September 2002

The Napa Sanitation District, California, ("District") submitted on August 23, 2002, an antidegradation analysis report ("report") to the Regional Water Quality Control Board ("Regional Board"). The Regional Board's response to the report summarized some of the legal issues, summarized the analysis, and then requested information as follows:

> The Antidegradation Analysis is conditionally approved by Board staff provided that the Discharger submits a supplemental to the Antidegradation Analysis by September 26, 2002, which should include the following (1) re-evaluation of the result using the correct WQOs for copper, mercury and cyanide, which are the more stringent of the salt water and fresh water criteria from CTR and Basin Plan; (2) another analysis using worst-case scenario, which is a conservative combination of low flow (dry weather), maximum effluent concentration, and minimum ambient background concentration, and (3) if available, data from recent background sampling study required by the August 6, 2001 letter.

Although the District does not concede that the CTR criteria are the "correct WQOs", the Regional Board's requests are addressed in this supplemental document.

(1) Re-evaluate the results using the correct Water Quality Objectives (WQOs) for copper, mercury and cyanide, which are the more stringent of the salt water and fresh water criteria from the CTR and Basin Plan.

The referenced criteria for constituents of concern are presented in Tables 1 and 2. Shaded cells indicate WQOs that were not presented in the original antidegradation analysis. Bolded values indicate lower WQOs than presented in the original antidegradation analysis.

Table 1. Basin Plan numeric water quality objectives (WQO) for freshwater and saltwater. All units are μg/L and apply to total recoverable concentrations.

Pollutant	Freshwater		Saltwater	
	CCC(1)	CMC(2)	CCC	CMC
Cyanide	5.2	22.0	--	5.0
Copper(3)	11.8	17.7	--	--
Mercury	0.025	2.4	0.025	2.1

(1) Criteria Continuous Concentration
(2) Criteria Maximum Concentration.
(3) A hardness of 100 mg/L as $CaCO_3$ was used to estimate freshwater concentrations. A translator for copper of 0.42 is used to convert *chronic* dissolved WQOs to total recoverable WQOs. A translator for copper of 0.57 is used to convert *acute* dissolved WQOs to total recoverable WQOs. These values are based on the District's *Copper Translator Study Progress Report* (dated June 28, 2002) for wet weather conditions (there are separate translators for dry weather conditions).

Table 2. CTR numeric water quality objectives (WQO) for freshwater and saltwater. All units are μg/L and apply to total recoverable concentrations.

Pollutant	Freshwater		Saltwater		Consumption of Organisms
	CCC(1)	CMC(2)	CCC	CMC	
Cyanide	5.2	22.0	**1.0**	**1.0**	--
Copper(3)	21	23	7.4	8.4	--
Mercury	--	--	--	--	0.051

(1) Criteria Continuous Concentration
(2) Criteria Maximum Concentration.
(3) A hardness of 100 mg/L as CaCO3 is used to estimate freshwater concentrations. A translator for copper of 0.42 is used to convert dissolved *chronic* WQOs to total recoverable WQOs. A translator for copper of 0.57 is used to convert dissolved Basin Plan *acute* WQOs to total recoverable WQOs. These values are based on the District's *Copper Translator Study Progress Report* (dated June 28, 2002) for wet weather conditions (there are separate translators for dry weather conditions).

The re-evaluations for each of the three constituents of concern are discussed here.

Cyanide

For cyanide, the Regional Board contends that the CTR saltwater criteria apply. The District does not agree with this contention, but will provide an analysis using these numbers as implicitly requested by the Regional Board. CTR criteria for cyanide in saltwater (1.0 μg/L) are lower than the Basin Plan criteria for cyanide in saltwater (5.0 μg/L). Effluent data compare to these criteria as shown in Figure 1 (a revision to Figure 2a in the original analysis).

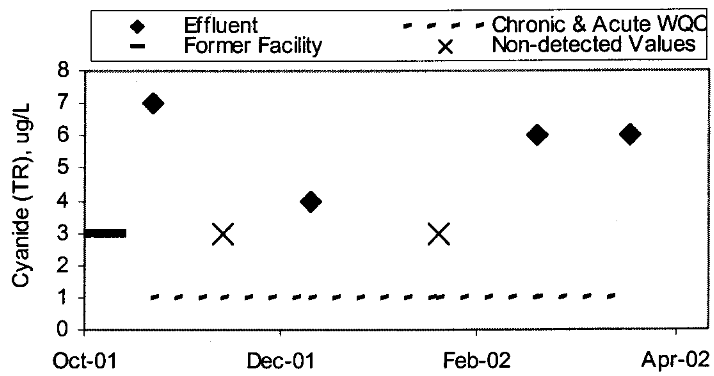


Figure 1. Effluent water quality data for the former facility (median values for 1997-1999 river discharge periods) and current facility (monthly average values) compared to CTR chronic and acute WQOs for cyanide.

The assessment of water quality impacts is not qualitatively different than presented in the original analysis. As noted in the original analysis, the applicable criteria for cyanide, intended to protect against toxic effects to aquatic organisms, are based on laboratory-condition tests using free cyanide. Cyanide is rarely detected and, as stated in the Basin Plan[1], may not persist in the environment of San Francisco Bay in the same manner as heavy metals. Site-specific WQOs, due in June 2003, will be more appropriate criteria than existing WQOs.

Copper

Section 3.2 (California Toxics Rule Water Quality Criteria) in the original analysis uses the saltwater CTR criteria for copper. The translators are based on the report cited, and result in the lowest WQOs. These WQOs were also used in the original analysis, so no supplemental analysis is needed.

Mercury

The CTR does not include CMC and CCC values for mercury. The only criterion given in the CTR is for human consumption of organisms. That criterion, 0.051 μg/L, is higher than the lowest applicable Basin Plan criterion. Thus, the lowest applicable WQOs from the Basin Plan were used in the original analysis and no supplemental analysis is needed.

[1] See page 4-70, Table 4-3, footnote f.

(2) Include another analysis using worst-case scenario, which is a conservative combination of low flow (dry weather), maximum effluent concentration, and minimum ambient background concentration.

This request is inconsistent with the original analysis presented because the original analysis presented results in terms of a) incremental increase in mass loading, and b) undiluted effluent concentrations relative to WQOs (as discussed, in part, in response to request #1 above). However, the District will attempt to present the information requested by the Regional Board and place it into context.

Mass Loading

The mass loading estimates are independent of receiving water flow conditions and ambient background concentrations. It is unrealistic and inconsistent to compute effluent mass loads (a long-term effect) based on maximum concentrations (a one-time occurrence) and compare those values to long-term estimates for other sources. It is also inconsistent to use median effluent concentrations in estimating the mass load of the former facility and to use maximum effluent concentrations in estimating the mass load of the existing facility. Nonetheless, Table 3 presents the percent contributions of municipal dischargers and the facility to total annual mass loading into San Pablo Bay under these conditions (a revision to Table 7 in the original analysis).

Table 3. Percent of estimated total annual mass loads to San Pablo Bay contributed by municipal discharges and the District. Napa's contributions are based on median effluent concentrations.

Constituent	% from all Municipal Dischargers	Percent from Napa Previously	Percent from Napa Currently
Copper	1.42%	0.012%	0.077%(1)
Mercury	1.23%	<0.012%	0.179%(2)

(1) 0.022% in original analysis.
(2) 0.006% in original analysis.

Municipal dischargers are estimated to contribute a very small percentage of the total mass loads of copper and mercury to San Pablo Bay. As shown in Table 3, the increase in the District's discharged concentrations results in a potential increase of approximately 0.07% in their contribution to San Pablo Bay's total annual mass loading of copper. For mercury, using the maximum effluent concentration (15 times higher than the next highest value, 38 times higher than the median, and indicated by the Regional Board in the proposed permit amendment to be aberrational) indicates an increase in mass loading of approximately 0.17%.

Concentrations

Effluent concentrations were assessed in the original analysis without accounting for any dilution, which assumes that receiving water flows are zero. Using minimum ambient background concentrations would serve to dilute the effluent, and therefore would not represent a worst-case scenario. However, the following analysis presents the requested calculations.

The concentrations of constituents downstream of the effluent outfall is calculated by dilution, which assumes that the constituents are conservative (masses and volumes are simply additive):

$$C_{ds} = \frac{(C_{effl} * Q_{effl}) + (C_{us} * Q_{us})}{Q_{ds}}$$

where C and Q represent concentration and flow rate, respectively. The subscripts represent values for effluent ("effl"), upstream of the outfall ("us") and downstream of the outfall "(ds"). Values for these variables are selected as follows, in accordance with the requested worst-case scenario:

Dry Weather River Flow

The "dry weather" flow rate must be interpreted to mean dry weather conditions during the District's discharge period (which is limited to the wet season). The District has a seasonal discharge limitation because of the seasonality of flow conditions in the Napa River. Thus, the 5th percentile flow rate for data during the discharge season (November-April) is used.

The Napa River flow gage, maintained and reported by the USGS, is used to represent flow rates in the Napa River upstream of the District's outfall. This gage is located at latitude 38°22'06", longitude 122°18'08", at an elevation of 25 ft. This location is upstream of the City of Napa and above tidal influences. Data are available for the period October 1929 to November 2001, but only data since 1970 are used because of the significant hydrologic changes in the watershed (i.e., data prior to 1970 is not representative of potential future conditions). The subset of data contains 5,619 records.

The 5th percentile flow rate for these conditions is **1.4 cfs**.

Maximum Effluent Concentration

Maximum effluent concentrations for the three constituents of concern are, as tabulated in the original antidegradation analysis report:

- **Cyanide: 7.0 µg/L**
- **Copper: 13 µg/L**
- **Mercury: 0.15 µg/L (or 0.01 µg/L using the next lowest value)**

Minimum Ambient Background Concentrations

The minimum values for copper and mercury as presented in the original antidegradation analysis report are as follows:

- **Copper: 0.6 µg/L**
- **Mercury: 0.008 µg/L**

Cyanide is not monitored in the receiving waters. A value of zero is thus assumed as a minimum.

Effluent Flow Rate

An additional layer of conservativeness for effluent flow rate was not requested, but the permitted dry weather flow design capacity is used: 15.4 mgd (**23.8 cfs**).

Results

Using the values presented here, worst-case scenario ambient concentrations of the constituents of concern are as follows:

- **Cyanide: 6.61 µg/L**
- **Copper: 12.3 µg/L**
- **Mercury: 0.14 µg/L (or 0.01 µg/L using the next lowest value)**

These values are all lower than the maximum effluent concentrations noted in the original analysis because of receiving water dilution and do not change the conclusions presented in the original anti-degradation analysis report.

(3) If available, include data from recent background sampling study required by the August 6, 2001 letter.

Preliminary data are being sent to the Regional Board in separate documents. Please note that the data have not been subject to a full QA/QC analysis yet and therefore should be considered preliminary.